

No. 13114

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In the United States Court of Appeals  
for the Ninth Circuit

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WAIALUA AGRICULTURAL COMPANY, LIMITED, A  
CORPORATION, APPELLANT

v.

CIRACO MANEJA, ET AL., APPELLEES

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APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES  
FOR THE DISTRICT OF HAWAII

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BRIEF FOR THE SECRETARY OF LABOR, UNITED STATES  
DEPARTMENT OF LABOR, AS AMICUS CURIAE

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**BRIEF FOR THE SECRETARY OF LABOR, UNITED STATES  
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## **STATEMENT OF THE CASE**

The Secretary of Labor, United States Department of Labor, by virtue of Reorganization Plan No. 6 of 1950 (15 F. R. 3174), 64 Stat. 1263, 5 U. S. C. 133z-15, effective May 24, 1950, is charged with duties and responsibilities in the administration of the Fair Labor Standards Act of 1938 (c. 676, 52 Stat. 1060, 29 U. S. C. sec. 201 et seq.). As this appeal presents significant questions concerning the proper interpretation and application of the exemptions contained in Sections 13 (a) (6) and 7 (c) of the Act which are of importance in its general administration and enforcement, the Secretary, with leave of Court, respectfully submits this brief as amicus curiae.

This is the second appeal in this action brought by appellant employer to obtain a declaratory judgment that the wage and hour provisions of the Act do not apply to any of its employees (R. 6-15, 181-183). The Answer (R. 16-19; 24-26) of the defendant employees, who were originally sued as representative of a class, contended that their employment was covered by the Act, broadly asserted that the exemptions were inapplicable, and counterclaimed under Section 16 (b) for unpaid overtime compensation. Also named as defendants were the union which represented the employees and its regional director. Each side appealed from the original judgment of the district court. Pursuant to an order of this court remanding the cause for further proceedings because of the absence of a positive judgment and detailed findings of fact (178 F. 2d 603, 606), the case was retried. The pleadings were then amended so as (1) to eliminate the representative character of the suit, (2) to name the 42 employees sued in their individual capacity as the sole defendants, and (3) to limit the action to the period from November 20, 1946 to and including September 19, 1947. After a trial at which an extensive stipulation (R. 27-128, 179-181) was introduced and 22 of the employees testified (R. 614, 5), the court entered a judgment from which only the plaintiff-employer has appealed.

Plaintiff, the third largest producer of raw sugar in the Territory of Hawaii, is engaged in (1) growing and harvesting sugar cane, and (2) processing such cane into raw sugar at its mill. It provides its own supporting railroad transportation, repair, maintenance, and other services. Plaintiff contends that the agriculture exemption of Section 13 (a) (6) exempts *all* of its employees (with the minor exception of some employees working at the company village, see appellant's br. p. 16) from both the minimum

wage and overtime compensation provisions, and that the exemption in Section 7 (c) for processing sugar cane also exempts all of its employees except those who work on the fields where the sugar cane is grown from the overtime requirements of the Act. It employed 1,144 persons as of September 1946 (R. 36) over an area of 9,663 acres (R. 33). Their work and duties are described in the stipulation in detail (R. 27-128), which is summarized below as it relates to the issues herein discussed.

### **Farming**

The trial court found that in its farming activities, plaintiff employs field workers (R. 633-4; 643) who plow the land (R. 39-40; 191), plant the seed (R. 40-42), cultivate and fertilize the soil (R. 42-44), irrigate the land (R. 45-8, 308-10), and harvest the crop (R. 52-59; 193, 196). They also move the cut cane over portable track (R. 58-59; 198-201) to plaintiff's main line railroad. Since cane is grown in Hawaii on a year around basis, "the cane lands are in various stages of production or preparation" (R. 35). The employees who work in the fields move from one area to another depending upon the program of plowing, planting, irrigating, fertilizing, applying herbicides and insecticides, weeding, and harvesting" (R. 35).

### **Manufacturing**

The court below also found that to carry on its function as a processor of sugar cane, plaintiff operates and maintains a mill composed of a cane cleaning plant, a cane crushing room, a boiling room, and a bagging room (97 F. Supp. at 207,<sup>1</sup> R. 723). The mill

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<sup>1</sup> References are made to portions of the opinion of the district court appearing in 97 F. Supp. 198, 201, which, pursuant to order of court (R. 717, 718), were not printed in the transcript. These consist of the sections on "Statement and Findings" and "Com-

is an industrial type of facility located in the yard area separate and distinct from the growing fields (R. 721, 723; 66-82). In the cane cleaning plant plaintiff's employees operate a series of machines connected by conveyors which receive the cane from the cars, wash off the dirt and mud, and then strip off the leaves (R. 66-72, 310). At the crushing plant the cane passes under a set of revolving knives which chop it up; it then is crushed between a series of large steam-driven rollers (78" wide and 39" in diameter) to extract the juice from the fibre (R. 72-76, 313). The juice is pumped to the boiling house while the remaining cane fibre (called "bagasse") moves by conveyor to the fire room where it is used as fuel in the generation of steam and electricity (R. 75). In the boiling house the juice is clarified, filtered, evaporated to a syrup, crystallized in centrifuges (R. 76-80, 213; 314, 317), and then bagged for storage and shipment (R. 82; 318). In order to install improved equipment and methods of operation as well as to repair mill machinery and equipment, the mill is closed down for approximately three months each year (97 F. Supp. at 208; R. 109-111; 114-116; 176).

#### Transportation and maintenance

Plaintiff operates a railroad, maintains service shops for the repair and overhaul of its field, transportation, and mill equipment, operates a laboratory for testing its products during the course of field and mill operations (R. 103), a plant for the manufacture of concrete products (R. 105), warehouses (R. 84; R. 106-108), stables (R. 109), a village community, "similar to a typical small town of a farming com-

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merce Coverage." The sections on "Findings of Fact" with respect to the individual work weeks of each defendant, and the "Conclusions of Law" appear in the Record at 190-320.



munity center” (97 F. Supp. at 213), which houses all but 16 of plaintiff’s employees (R. 121), and an administrative organization (R. 108).

Plaintiff’s railroad system consists of 56 miles of main line and nine miles of portable track. It is equipped with ten locomotives and seven hundred twelve cane cars (R. 59–61). Plaintiff maintains a roundhouse for servicing this equipment (R. 103). As the lower court found, the personnel employed to perform this function are typical railroad employees—locomotive engineer (R. 205–206), locomotive repairman (R. 206–208), and section hand (R. 208–210); they do no farm work (R. 204–212). The investment in the railroad amounts to nearly \$800,000 (R. 647).

Plaintiff maintains complete shops for prompt minor repair and emergency work and major overhaul (R. 94) which employ upwards of 100 men (R. 94–103). They are housed in several substantial buildings separate from the processing operations in an area up to 300 feet from the mill (R. 723). They include a machine shop, welding shop, blacksmith shop, tinsmith shop, cane loading machine repair shop, tractor repair shop, garage, electric shop, carpenter shop, paint shop, and plumbing shop (R. 94–103). The persons employed in these activities are persons with highly specialized skills—machinists, welders, electricians, painters, carpenters, etc. (R. 94–103). They do no general farm work (R. 94–103).

The court below held that “in the conduct of these enterprises, plaintiff has assumed a variety of functions including those of farmer, carrier, manufacturer, shipper and operator of village communities.” (97 F. Supp. at 218). It concluded that “Railroading is not farming or processing, nor intended by the Act to be a part of either” (97 F. Supp. at 221), that processing



of the cane is a separate function and not a subordinate part of farming (97 F. Supp. at 223), and that the repair shops are "self-sufficient units, operated not as an incident to any other operation exclusively or dominantly, but rather as an integral part of the overall combination of separate enterprises jointly conducted by plaintiff" (97 F. Supp. at 225).

On the basis of these findings and conclusions the court below entered a judgment with which the Secretary concurs except for a minor difference noted *infra*.<sup>2</sup> The court below held:

(1) The Section 13 (a) (6) exemption is applicable to employees engaged in plowing, planting, cultivating, fertilizing, irrigating, and harvesting, including transporting the cut cane over the portable track to the main line railroad, but does not apply to any function or activity beyond "the concentration of cars loaded with cane, upon the main line railroad" (97 F. Supp. at 220). (2) The Section 7 (c) exemption is applicable to "the work of employees which takes place in the mill, in connection with the operation of processing machinery and activities closely and intimately connected therewith" (97 F. Supp. at 223), including the work of employees making repairs during the weekend shutdown (97 F. Supp. at 224), but is not applicable to the work of employees performing any of the farming, transportation, maintenance and repair (other than during the weekend shutdown), or village maintenance activities. (3) An exemption is applicable to any work week in which a defendant engaged exclusively in one or more exempt activities but does not apply "where in any given work week a defendant engaged in [covered] activities some of which were nonexempt" (97 F. Supp. at 233).

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<sup>2</sup> See footnote 7, page 9.

## QUESTIONS PRESENTED

1. Whether employees engaged in operating the main line railroad, in processing cane into raw sugar at the mill, or in providing repair and maintenance services for the mill and railroad are employed in "agriculture" within the meaning of Section 3 (f) of the Act, and are, therefore, exempt from the minimum wage and overtime provisions of the Act by Section 13 (a) (6) thereof.

2. Whether employees engaged in operating and maintaining the mainline railroad, repairing and maintaining mill machinery during the off season, or engaged in generating steam and electric power are exempt from the overtime provisions of the Act by virtue of the Section 7 (c) exemption for processing sugarcane.

3. Whether employees who in the same workweek perform work, part of which is of the type described in Sections 13 (a) (6) or 7 (c), and part of which is covered and not subject to any exemption are exempt from the overtime requirements of the Act.

## ARGUMENT

### I

**The Section 13 (a) (6) exemption for employees employed in agriculture applies to those performing appellant's farming function, but does not extend to those operating appellant's sugar mill, or railroad, or the repair and maintenance services for the mill and railroad**

Appellant operates a farm, a factory, a railroad, a repair and maintenance shop, and other services (R. 33-5; 66-83; 59-64; 94-103). The fact that some of its employees are engaged in farming does not make the Section 13 (a) (6) exemption applicable to its employees engaged in these other operations. The duties of the employee determine the application of

the exemption (“any employee employed in agriculture”) just as they determine the application of the coverage provision (“any of his employees who is engaged in commerce or in the production of goods for commerce”) *Walling v. Jacksonville Paper Co.*, 317 U. S. 564; *Kirschbaum Co. v. Walling*, 316 U. S. 517.<sup>3</sup>

Agriculture is defined in Section 3 (f) of the Act as including:<sup>4</sup>

\* \* \* farming in all its branches and among other things includes the cultivation and tillage of the soil \* \* \* the production, cultivation, growing, and harvesting of any agricultural or horticultural commodities \* \* \* and any practices \* \* \* performed by a farmer or on a farm as an incident to or in conjunction with such farming operations, including preparation for market, delivery to storage or to market or to carriers for transportation to market.

The court below decided that the Section 13 (a) (6) exemption was applicable to employees engaged in activities beginning with the preparation of the land for planting and ending with hauling the harvested cane to the main line railroad.<sup>5</sup> This exemption was held not applicable to the employees engaged in any

<sup>3</sup> Compare the similarly worded exemptions provided in Sections 13 (a) (1), 13 (a) (3), 13 (a) (5), and 13 (a) (10), and contrast 13 (a) (4), 13 (a) (9), and 13 (b) (2) showing a choice of different language when it was intended to make exemption depend upon the type of employer.

<sup>4</sup> The pertinent statutory provisions are set out in full in the appendix, *supra*, pp. 37-38.

<sup>5</sup> Specifically the court held that the following activities were exempt under 13 (a) (6): Using a tractor to prepare the field for planting by clearing rocks, weeding, plowing; using a tractor to clear irrigation ditches and to make beds for portable track; burning cane in preparation for harvesting; operating cane loading

other function or activity.<sup>6</sup> Appellant contends that Section 13 (a) (6) exempts (with minor exceptions not relevant here) all of its employees (br., p. 11). The Secretary of Labor and the Administrator of the Wage and Hour and Public Contracts Divisions have interpreted Section 13 (a) (6) as it was interpreted by the court below except that they believe it also exempts employees exclusively engaged in repairing and maintaining equipment and facilities used only in the performance of activities exempt under this section.<sup>7</sup>

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machines to cut and load cane; operating a tractor to haul cane cars to and from the mainline railroad; picking up scattered cane in fields; bulldozing cane into piles; making minor repairs to field equipment; operating the irrigation system (R. 191, 194, 196, 198, 201, 308-10).

<sup>6</sup> Specifically, the court ruled the 13 (a) (6) exemption was not applicable to the employees engaged in the operation of the *main-line railroad* (locomotive engineer (R. 205-6), locomotive repairmen (R. 206-7), section hand (R. 208-9), crossing watchman (R. 210-1)); or in the operation of the *processing mill* (cane cleaner (R. 310-2), crushing plant operator (R. 213), evaporator operator (R. 212-3), centrifugal machine operator (R. 314-6), boiling house employee (R. 316-8)); or in the *bagging and warehousing of sugar* (bagger and loader (R. 317-8), warehouse clerk (R. 318-9)); or in the *operation of the utility plant* (boiler fireman (R. 216-8), power plant operator (R. 218-220)); or the performance of *maintenance and repair work* (auto mechanic (R. 220-223), welder (R. 223-226), machinist (R. 227-231), tractor mechanic (R. 231-235, 273-276), caneloading machine repairman (R. 239-243), blacksmith (R. 243-248), painter (R. 256-257), concrete products operator (R. 257-8), plumber (R. 259-263), carpenter (R. 264-273, 277-8)); or the following *miscellaneous occupations* (clerk-stenographer (R. 319-320), truck driver (R. 235-239, 248-256), road grader (R. 279-283), laboratory technician (R. 285-286), utility clerk (R. 286-288)).

<sup>7</sup> Thus, it is the position of the Secretary that a workweek spent in repairing tractors, tractor auxiliary implements, or cane loading machines is within the Section 13 (a) (6) exemption provided the equipment was used exclusively for plowing, planting, culti-



The Supreme Court's analysis of the Section 13 (a) (6) exemption in *Farmers Irrigation Co. v. McComb*, 337 U. S. 755 supports the view taken by the Secretary and the court below. There it was held that the employees of a mutual irrigation company which was owned by farmers and distributed water to their individual farms were not exempt under Section 13 (a) (6) since the irrigation system was neither operated by a farmer nor on a farm. In reaching this conclusion the court analyzed the exemption thus:

First, there is the primary meaning. Agriculture includes farming in all its branches. Certain specific practices such as cultivation and tillage of the soil, dairying, etc., are listed as being included in this primary meaning. Second, there is the broader meaning. Agriculture is defined to include things other than farming as so illustrated. It includes any practices, whether or not themselves farming practices, which are performed either by a farmer or on a farm, incidently to or in conjunction with "such" farming operations. [337 U. S. at 762-763.]

It is apparent that only under the second meaning need we give more than passing consideration to plaintiff's processing, transportation, and maintenance employees. Clearly employees who engage in operating the mill or railroad or in repairing either are not engaged in "the cultivation and tillage of the soil" or "the production, cultivation, growing and harvesting"—the branches of farming.

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vating, harvesting or moving the portable track. For example, contrary to the conclusion of the court below, we would regard the exemption as applicable to Hayashi's workweek of January 6 (R. 197) during which all of his work was in the repair of cane loading machine #303 as that machine was used exclusively to cut and load cane in the fields (R. 295).

And it is principally under this second meaning that the plaintiff seeks to have the exemption for employees engaged in agriculture applied to its employees engaged in manufacturing raw sugar, operating its main line railroad, its repair, maintenance, and other activities (br., p. 28). But the employees engaged in these activities do not come within this definition, first, because plaintiff neither performs these operations in its capacity as a farmer nor are they performed on a farm, and second, because they are not performed "as an incident to or in conjunction with such farming operations."

Plaintiff is both a farmer and a processor; its 9,663 acres (R. 33) include a farm and a manufacturing plant (R. 723) as well as numerous transportation, repair and other facilities. "The mill operations are so conducted as to assume the character of a distinct business enterprise of an industrial nature" (97 F. Supp. at 222), in buildings separate and in an area distinct from the growing fields (R. 721, 723, 66-82); they account for 29 percent of the total direct operating charges (R. 178). Appellant neither performs processing as a farmer nor on a farm any more than it engages in farming as a processor or in a factory; it functions in several capacities on its 9,663 acres (R. 33). The actual separation of functions is demonstrated in a number of ways. The areas allotted to growing sugarcane are distinct from those allotted to processing and those occupied by the main line railroad and the repair activities (R. 721, 723). Organizationally, the functions are separated; the farming operations are performed through a field department (R. 633-4; 643) headed by a field superintendent; the processing, transporting, and repair operations are performed through a factory and shop department headed by a factory superintendent (R. 633-4; 643). Operating charges are segregated according to culti-

vating, irrigating, harvesting, general field expense, transportation and manufacturing (R. 178). The mill is operated by a separate work force which does no work in the field (97 F. Supp. at 223).

To accomplish its purpose of producing raw sugar, appellant plainly engages in many separate and distinct enterprises appropriate to that end, including manufacturing and transportation, as well as farming. This integration of business operations neither conceals the essential nonagricultural character of appellant's manufacturing functions nor submerges the fact that appellant, in operating a hybrid type of business, has assumed the functions of a manufacturer and a railroad company, as well as those of a farmer.

In this, appellant occupies a position with reference to the agriculture exemption analogous to the relationship of a chain store corporation to the "retail \* \* \* establishment" exemption provided in Section 13 (a) (2). As there is no exemption for wholesale establishments, and as the central offices and warehouses of such chains serve the economic function of the wholesaler, the Supreme Court has held that "most chain store organizations are \* \* \* of a hybrid retail-wholesale nature," and has denied the "retail \* \* \* establishment" exemption to such central offices and warehouses. *Phillips Co. v. Walling*, 324 U. S. 490, 495. Just as the chain store cannot obtain the retail exemption for its central office and warehouse merely because the services of those units are restricted to exempt retail outlets, so here, appellant cannot achieve exemption for its separate manufacturing function and its railroad activities simply because it utilizes them only for the products of its farm.

Furthermore, even if appellant were performing the manufacturing, railroad, and repair operations as



a farmer, and even if they were performed on a farm, the exemption, by its terms, has no application unless the operations are conducted as an "incident to or in conjunction with such farming operation." In the context of the statute as a whole, it seems plain that this requirement is not satisfied merely by the fact that the railroading and processing must necessarily occur subsequent to the growing and harvesting of sugar cane. Sections 13 (a) (10) and 7 (c) show a design to treat separately the many types of operations which are "incident to or in conjunction with" farming only in the sense that they are performed on agricultural commodities subsequent to harvesting.

Appellant, in discussing this requirement, places the emphasis on the word "such" (br., p. 31), and argues that since it processes only cane grown on its own farms, the operation of the railroad and the manufacturing of raw sugar is "incident to or in conjunction with *such* farming" (emphasis supplied). This, however, assumes that the operation of a railroad is "incident to or in conjunction with" the function of farming. But, as *Calaf v. Gonzalez*, 127 F. 2d 934, 938 (C. A. 1) held, "what we have in the case before us is a mill engaged in the processing of sugar cane and also engaged in the transportation of that sugar cane from farms to the mill. There seems no rational basis for saying that simply because the ownership of the mill and the farms is in the same hands that, therefore, those employees who are engaged in an activity which is separate and distinct from agriculture are exempt from the provisions of the Act." The *Calaf* case is squarely in point here. It involved precisely the same kind of hybrid operation in Puerto Rico. Contrary to the statements on pages 31, 40 and 42 of Appellant's brief, nothing in *Farmers Ir-*

*rigation Co. v. McComb*, 337 U. S. 755 supports the view that the railroad and manufacturing activities here involved are “incident to or in conjunction with” the farming activities merely because they are restricted to, or use as raw materials, crops grown by the same corporation. Plainly irrigation bears a closer relation to farming than converting crops into manufactured products. Indeed, the very decision cited with approval in the footnote on which appellant relies, *Bowie v. Gonzalez*, 117 F. 2d 11 (C. A. 1), held that mill and railroad employees would not fall within the reason for the exemption since they were typical factory workers or laborers engaged in maintaining industrial facilities.

Appellant’s main line transportation and manufacturing activities cannot properly be regarded as being performed “in conjunction with” or “incident to” its farming operations. They obviously occur separately from and subsequent to the farming operations. Their substantial, as distinguished from incidental, importance in relation to the farming operations is demonstrated by appellant’s record of its total direct operating charges (R. 178). The direct operating charges attributable to main line transportation and manufacturing alone are 55 percent of all other such charges, including those for the agricultural activities. Both the main line transportation and manufacturing activities require organization, equipment, and skills quite unrelated to farming. As the court below observed:

A separate work force is employed for the processing operation in the mill; it does no work in the fields; it is paid in accordance with a scale of hourly rates which are different and distinct from the system used, partly at contract rates and partly at hourly rates, to pay farm labor [97 F. Supp. at 223].

Railroad operation is a systematic business calling for the employment of skilled, experienced men, trained to quick, keen perception (not farm hands or mill hands) for handling locomotives and moving cars (not the goods in transit), and for the maintenance of roadbed, track, and structures, and roundhouse care and servicing of locomotives—all specialized technical work [97 F. Supp. at 221].

Since neither the processing function nor the transportation activities are performed in “conjunction with” or “incident to” the farming function, it follows *a fortiori* that the repair and maintenance of equipment used in these operations cannot come within the 13 (a) (6) exemption.

Appellant asserts that its substantial activities in operating the mill, running the railroad, and providing the repair and maintenance services do not distinguish it from farmers generally in that “every farmer” is a “carrier” and a “manufacturer” in addition to being a farmer because he “hauls his products from the fields to storage” or to market after transforming the product he grows “into marketable condition” (br., p. 24). But what appellant fails to recognize is that while farmers generally have barns, silos, and wells (br., p. 30), appellant here has elaborate industrial and railroad facilities (R. 721–723) not to be found on a typical farmer’s acreage, and while some farmers may engage in processing or transportation activities through employees who normally work at tilling the soil, here the appellant performs these functions through a separate organizations (R. 633, 4; 643) and employs a large number of specially skilled craftsmen who do no farming (97 F. Supp. at 221, 225).

To apply the “agriculture” exemption to appellant’s manufacturing and main line railroad activities would

be to apply in Hawaii a rule at variance with the settled judicial interpretation of the Act which has been applied for years to this country's equally important sugar producing area of Puerto Rico. In its previous decision (178 F. 2d at 611) this Court appears to have regarded the decisions in *Calaf v. Gonzalez*, 127 F. 2d 934 (C. A. 1), and *Bowie v. Gonzalez*, 117 F. 2d 11 (C. A. 1) as based on the concept that the employer was "a communal enterprise by several farms." Clearly, however, this is not the basis on which the Court of Appeals for the First Circuit rested its decision in either of the above cases or in the later case of *Vives v. Serralles*, 145 F. 2d 552 (C. A. 1). In the first case presenting the question of the application of the Section 13 (a) (6) exemption to an organization which both grew sugarcane and processed it into raw sugar and molasses, the First Circuit held that the exemption did not apply to the processing operation. *Bowie v. Gonzalez*, 117 F. 2d 11 (C. A. 1). The only significant difference between the facts of that case and the one at bar is that there between 30 and 40 percent of the cane processed was grown by independent growers. That difference, however, is pertinent to only one of the three independent bases on which the court held that the processing did not come within the section of the definition on which appellant here relies. The court pointed out that the legislative history demonstrates that the purpose of that provision was "to make certain that independent contractors such as threshers of wheat, who travel around from farm to farm to assist farmers in what is recognized as a purely agricultural task, should be included within the definition of agricultural employees, and also to assist a farmer in getting his agricultural goods to market in their raw or natural state. See 81 Cong. Rec. 7876, 7888." The court further held:



Furthermore, it would seem that the employees involved in this case would not fall within the reason for the exemption which was accorded to agricultural employees. The Act was drawn not to include the latter because agricultural labor was not subject to the usual evils of sweatshop conditions of long hours indoors at low wages. Also any attempt to regulate agricultural wages would present a difficult problem since a substantial part of the agricultural workers' income must of necessity be for board and room. The employees in the instant case are typical factory workers or laborers engaged in maintaining industrial facilities. The exemption of agricultural labor from the operation of the Act is not admissible as an argument to exempt labor in an industry from its operation. *Fleming v. Hawkeye Pearl Button Co.* [113 F. 2d 52 (C. A. 8)]; cf. *North Whittier Heights Citrus Assn. v. National Labor Relations Board*, 109 F. (2d) 76, 80-81 C. C. A. 9th, 1940). For these reasons we reject the appellants' contention that the employees here involved are engaged in agriculture within the meaning of Section 13 (a) (6) and Section 3 (f) [117 F. (2d) at 18].

While the First Circuit also indicated that the fact that some of the cane processed was grown by independent "colonos" was a ground for holding the processing operation not merely "incidental," the two additional independent grounds of decision quoted above with reference to the legislative history of and reason for the exemption are equally applicable to the case at bar and require the same conclusion.

The significance of these two additional grounds became evident in the case of *Calaf v. Gonzalez*, 127 F. (2d) 934 (C. A. 1) which dealt with the application of the "agriculture" exemption to employees working on railroad transportation facilities used to

transport cane to a sugar mill. The mill, the railroad, and some of the farms on which the cane was grown were all owned jointly by the defendants. Though the railroad was also used to transport cane grown on farms owned severally by the defendants and on one farm owned by an independent "colono," the court expressly refused to base its decision on this fact. It stated, "We place our decision, however, on the broader ground that the transportation of sugarcane is incident to milling rather than to farming and therefore is not exempt under the Act" (127 F. (2d) at 936-937) and proceeded to give reasons for its conclusion just as though this fact on which appellant relies to distinguish the case did not exist. Thus, it stated that "The mere fact that in this case the owners of the farms are also the owners of the mill and the transportation facilities does not make transportation an incident to farming," (*id.* at 937) and "There seems no rational basis for saying that simply because the ownership of the mill and the farms is in the same hands that, therefore, those employees who are engaged in an activity which is separate and distinct from agriculture are exempt from the provisions of the Act" (*id.* at p. 938). It follows, of course *a fortiori* that since the exemption is inapplicable to transportation workers because transportation is incident to milling rather than farming, it is also inapplicable to mill employees under the same circumstances.

The reasoning of the *Bowie* and *Calaf* cases supporting our view that the agriculture exemption does not extend to the operation of a main line railroad and the manufacture of raw sugar has been followed in a case like the one at bar, where one business organization operates all the farm lands, the transportation facilities, and the mill (*Vives v. Serralles*, 145 F.

2d 552 (C. A. 1)). Contrary to appellant's assertion (br., p. 41) this case does not support its contention, but leads to the opposite result. It reaffirmed the principle enunciated in the *Calaf* case, *supra*, that "transportation \* \* \* is incident to milling rather than to farming," (*ibid.* at 554) but held the principle inapplicable where the activities under consideration "begin at a point when the sugar cane has been cut in the field and continue up to the concentration point" (*ibid.* at 555). It is at this concentration point that the issue in the instant case arises. The Secretary believes, as the court below held, that the Section 13 (a) (6) exemption was applicable to appellants' employees' engaged in harvesting the cane and bringing it to the main line railroad, but that here, as stated in *Vives v. Serralles*, *supra* at 554, employees "engaged in the operation, repair, and maintenance of the company railroad" are not within the agricultural exemption.

In *Vives v. Serralles*, *supra*, the "concentration point" is fixed with reference to the three types of transportation that were used on the growing fields. One of these types was practically identical with the transportation system used in the case at bar. It is described by the court as follows:

The cane is hauled to the concentration point in various ways; in small railroad cars pulled by oxen over portable tracks to a siding or switch where the cars are picked up by locomotives operated on the permanent tracks; \* \* \* [145 F. 2d. at 553]

Except for the irrelevant detail that appellant used tractors rather than oxen in that part of the transportation which occurred in the growing fields over portable tracks, appellant's system of rail transportation is identical (R. 57).



The reasons which led the Court of Appeals for the First Circuit to fix the point at which the portable tracks meet the permanent tracks as the dividing line between activities which are exempt under Section 13 (a) (6) and activities which are not, are equally applicable to the case at bar. In the *Serralles* case it was pointed out that the wages of laborers in the field engaged in operations up to the "concentration point" were regulated by the Secretary of Agriculture, under The Sugar Act of 1937 (50 Stat. 903; 7 U. S. C. 1100 et seq.). The need for a clear dividing line between the coverage of the two Acts, therefore, suggested the concentration point as an appropriate point of cleavage. The fact that this point also marked the end of the "harvesting" operation according to the interpretation of the Administrator and the view of the court was regarded as decisive. These facts and considerations are equally applicable to the case at bar.

## II

**The Section 7 (c) exemption for processing sugarcane does not extend to employees engaged in repairing and maintaining the sugar mill machinery during the off season, or in operating and maintaining the mainline railroad, or in generating steam and electric power**

Section 7 (c) provides that "In the case of an employee engaged \* \* \* in the *processing* of \* \* \* sugarcane \* \* \* into sugar (but not refined sugar) \* \* \* [the overtime provisions of the Act] shall not apply to his employees in any *place of employment where he is so engaged*" [Emphasis supplied.] This exemption was held by the court below to be applicable to "the work of employees which takes place in the mill, in connection with the operation of processing machinery and activities closely and intimately connected therewith" (97 F. Supp. 198,

223); and to the work of employees engaged in repair and maintenance activities in the mill during the weekend shut down but not during the three months "off season" (R. 176) when the mill is not in operation.<sup>8</sup>

Appellant asserts that the processing exemption is applicable, in addition, to the employees who operate the mainline railroad in transporting sugarcane from the fields to the mill, to employees who repair and maintain the railroad facilities, to employees who repair and maintain mill equipment during the "off season," and to employees who perform such other operations as generating electricity for covered non-exempt uses (br., p. 45).

The Secretary believes the court below correctly construed the exemption in accordance with the terms of the statute and the previous judicial decisions. On its face section 7 (c) is applicable, *first*, only in the case of an employer engaged in a described operation (in the instant case, processing of sugarcane), and, *second*, only as to those of his employees who work in a "*place of employment where he is so engaged.*" [Emphasis supplied.] Obviously, the exemption is not coextensive with *all* of the activities that may be undertaken by an employer who *inter alia* engages in the processing of sugarcane. To be within the ex-

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<sup>8</sup> The exemption was held applicable to employees performing the following work: weighing incoming cane cars at the mill; operating machinery for moving loaded cars into and empty cars out of the mill (R. 310-1); coupling and uncoupling cars at the mill and collecting car tickets (R. 312); regulating the flow of cane through the crushing mills (R. 313); operating machinery for boiling and crystallizing sugar (R. 213, 314-317); operating machinery for bagging sugar and loading bagged sugar into box cars or nearby warehouses (R. 318); and "cleaning and making minor repairs to boiling house equipment" (R. 213).

emption the employees must be engaged in the operations described in Section 7 (c) (i. e., processing of sugarcane), or in operations that are a necessary incident to the described operations and, in addition, they must be working *in* the "place" where their employer is engaged in such processing. On the other hand, the terms of Section 7 (c) do not include employees who work in a "place of employment" where their employer is *not* engaged in the actual processing of sugarcane, although the activities at that place may be, in a broad sense, incidental or necessary to such processing.

Appellant argues (br., p. 48) that the "place of employment where he is so engaged" can include appellants' "entire premises." The entire premises includes appellants' 9,663 acres (R. 33) on which appellant functions both as a farmer and a processor as well as performs various supporting activities (R. 721, 723). The same reasons heretofore advanced to demonstrate that this entire acreage is not a "farm" (*supra*, p. 11) make it equally clear that the entire premises cannot reasonably be deemed the "place" where appellant is engaged in the processing of sugarcane. Appellant's contention reads out of the exemptive provision the phrase "where he is so engaged" which seems clearly intended to limit the exemption to employees working "in" the particular "place" *in* which the employer is actually engaged in the processing operations. Thus, employees in the mill engaged exclusively in processing sugar cane into raw sugar, of course, come within the scope of the exemption. In a case where several contiguous buildings or areas located on the same premises and operated as a unitary establishment devoted to the described operations constitute a single "place of employment," the entire several buildings or areas

are a "place of employment where he is so engaged."<sup>9</sup> On the other hand, where only certain departments, areas, or buildings within an employer's premises are devoted to the described operations, the remaining departments, areas, or buildings cannot be deemed to be part of such "place of employment" without doing violence to the statutory language and the firmly established rules of statutory construction.

These views are fully supported by the decision in *Fleming v. Swift*, 41 F. Supp. 825 (N. D. Ill.), affirmed 131 F. 2d 249 (C. A. 7), which is the judicial authority most directly in point on this issue. The Swift Company was engaged in acquiring and slaughtering livestock and in the processing, manufacturing, and distributing of meat, meat products, and byproducts from livestock. Concluding that the description of operations and processes in Section 7 (c) places "a functional limitation on the classes of employees for whom an exemption from the overtime provisions may be claimed," the court held that the exemption applied on a department basis and not to defendant's whole plant. (41 F. Supp. 831.) Thus the court carved out for exemption only those departments of the meat-packing plant in which "handling," "slaughtering," and "dressing" operations were performed and held that the portions of the plant devoted to those operations constituted the "place of employ-

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<sup>9</sup> It would seem clear, as a correlative concept, that even though contiguous and located on the same premises, several buildings or areas are not always or necessarily component parts of a single place of employment. For example, a contrary conclusion would appear proper where any such building or area is organized and operated as a self-sufficient unit and the operations performed therein are performed independently of operations in the surrounding buildings or areas. Thus, in doubtful cases, factors other than geographical contiguity, such as interchange of personnel, flow of raw materials, payroll records, and techniques of supervision of the employees may have to be considered.



ment," and that employees in other departments, such as those devoted to meat-curing or sausage-making, were not within the scope of the exemption. To the same effect, see *Colbeck v. Dairyland Creamery Co.*, 70 S. Dak. 283, 17 N. W. (2d) 262 (S. Ct. S. D.); *Walling v. De Soto Creamery & Produce Co.*, 51 F. Supp. 938 (D. Minn.).

Appellant has oversimplified the problem presented, therefore, when it argues (br., p. 50-51) that if the railroad employees are engaged in operations incident to processing rather than to farming, then they are necessarily exempt under Section 7 (c).<sup>10</sup> Even assuming that they all are so engaged, the question still remains whether they work at a "place of employment" where their employer is engaged in the processing operations. Clearly most of the railroad

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<sup>10</sup> Appellants incorrectly assert that the decisions of the First Circuit (citing *Bowie v. Gonzalez*, 117 F. 2d 11 and *Calaf v. Gonzalez*, 127 F. 2d 934) assumed that transportation was exempt under Section 7 (c). Nothing in the Court's opinions warrants this conclusion. The *Bowie* case was a suit by the employer for a declaratory judgment that the complete exemptions in Sections 13 (a) (6) and 13 (a) (10) applied. Nothing in the opinions of the district (*Bowie v. Claiborne*, D. P. R. 1939, 1 W. H. Cases 243 1 Labor Cases (C. C. H.) ¶18, 443, not officially reported) or appellate court or the disposition of the case involved any such assumption. Only the appellate opinion is published in the *Calaf* case. It certainly contains no express assumption of the type appellant asserts, and there is nothing to indicate that any overtime hours were worked or overtime compensation sued for so as to involve any implied assumption as to Section 7 (c) in the award of minimum wages. Neither was the problem discussed or decided even by assumption in *Vives v. Serralles*, 145 F. 2d 552 (C. A. 1). In that case the suits of all of the employees but one were dismissed under Section 13 (a) (6), and the remaining employee, though held to be exempt from overtime compensation under Section 7 (c), was employed in the sugar mill and not on the railroad, so here too, no assumption as to the application of Section 7 (c) to transportation is involved even by implication.

employees do not. The train crews (R. 62), section men (R. 62), and crossing watchmen (R. 63) work all along the mainline which comprises some 56 miles of track (R. 60) and borders the entire ocean perimeter of the appellants' land (R. 721). The hostler and engine wiper perform their work in the plantation roundhouse (R. 63), well removed from the mill (R. 723).

The same considerations are applicable to repair and maintenance shops. They are located in separate buildings not connected with the mill where processing takes place (R. 723). Besides, the services performed therein are not principally for the processing activity, and therefore may not be considered incidental to it. While the percentage varies from shop to shop, the other activities of the appellant account for a majority of the work in each shop. It would appear that a very small, if not negligible, proportion of the work of the cane loading machine repair shop (R. 97-8), the tractor repair shop (R. 98-9), and the tinsmith shop (R. 97) was done for the mill. Only in the electric shop (R. 101) does the proportion equal 50 percent, and even here there is no indication that the work for the mill was segregated in any way (R. 213-216).

One of the employees whose status under Section 7 (c) is in issue operated the electric generator in the power house (R. 218-220) which supplied electric power for "operations throughout the plantation" (R. 218), which included, of course, the covered and nonexempt railroad, roundhouse, and office (R. 91, 723). Another operated the machinery in the fire room which produced the steam both to power the electric generator and for use in the mill (R. 216-218). Even if these employees are regarded as being employed in the place where their employer is engaged

in processing sugarcane into raw sugar because that is done in other rooms in the same building (R. 723), the district court was correct in holding the Section 7 (c) exemption inapplicable to them. This is because their duties included the production of electric power for covered activities of their employer not excluded by this or any other exemption from the overtime compensation provisions of the Act. Where exemptions have been provided for "any employee" of designated type of employers, the courts have held that if the employer engages in activities in addition to those which bring him within the exemption, employees who have duties relating to the nonexempt as well as the exempt phase of the business are not exempt despite the literal wording of the exemptive provision. Otherwise an employer within an exemption could engage in many assorted businesses and claim exemptions for all his employees because one of the businesses was described in Section 7 (c) or 13.

Specifically with respect to the exemption in Section 7 (c), the courts have held that employees such as those engaged here in the production of steam and electric power are not within the exemption. In *Walling v. Bridgeman-Russell Co.*, 2 W. H. Cases 785, 6 Labor Cases (C. C. H.) 161,422 (D. Minn., 1942, not officially reported) the court was concerned with the application of the exemption in Section 7 (c) for "an employer engaged in the first processing of milk, whey, skimmed milk, or cream into dairy products \* \* \*." The court held that the "Section 7 (c) [exemption] does not exempt industries from the overtime provisions of the Act, but only the specific processes therein mentioned," and accordingly ruled that the exemption did not apply to employees in the same place of employment who made the steam and generated the power used exclusively for op-



erating equipment and heating and lighting the building where activities described in the exemption and other related activities not so described were carried on. *Shain v. Armour*, 50 F. Supp. 907 (W. D. Kentucky, 1943) also arose under the same portion of Section 7 (c) and also involved the application of the exemption to "employees engaged in producing steam, heat and power" for exclusive use in the same building in activities described in the exemption and related activities not so described. The court held the exemption was inapplicable because "Section 7 (c) of the Act does not exempt industries as a whole from the overtime provisions of the Act, but only those specific processes therein mentioned" [50 F. Supp. at 911].

The same principle has been applied to the other so-called "employer" exemptions provided in the Act. *Walling v. Connecticut Co.*, 154 F. 2d 552 (C. A. 2) also involved employees engaged in the production of electric power for use by their employer in his exempt business as electric railway carrier. Though Section 13 (a) (9) exempts "any employee" of such an employer, it was held not to apply to these employees because the power they produced was used in operating nonexempt instrumentalities of interstate commerce as well as the exempt electric railway. So here, the use of part of the power produced by appellant's employees in the covered and nonexempt railroad and office activities makes the exemption restricted to processing sugarcane inapplicable to these employees. Another instance in which the court refused to apply the literal terms of an exemption because to do so would produce a result not fairly within its purpose is presented by the decision of the Eighth Circuit in *Northwest Airlines v. Jackson*, 185 F. 2d 74, certiorari denied, 342 U. S. 812. There the exemption in Section 13 (b) (3) for "any employee of a car-

rier by air" was held not to apply to employees of such a carrier whose duties related to modification of planes for the Government. Similarly in *Davis v. Goodman Lumber Co.*, 133 F. 2d 52 (C. A. 4) the exemption in Section 13 (a) (2) for "any employee employed in any retail or service establishment \* \* \*" was held inapplicable to employees working in the manufacturing phase of the employer's retail establishment. To the same effect see *Wabash Radio Corp. v. Walling*, 162 F. 2d 391 (C. A. 6); *Western Union Telegraph Co. v. McComb*, 165 F. 2d 65 (C. A. 6), certiorari denied, 333 U. S. 862; *Nelson v. Agwilines*, 70 F. Supp. 497 (S. D. N. Y.).

The district court also held that the Section 7 (c) exemption is inapplicable to employees engaged in mill repair and maintenance work during the "off season," a period of approximately three months each year when processing operations have been definitely suspended and major maintenance and repair activities are undertaken. The "off season" ruling, we submit, is consistent with the legislative purpose of Section 7 (c), and in accord with judicial authority.

While employment in the "place" where the processing is carried on is a necessary condition to the applicability of the exemption, the words "place of employment," as appellant contends (br., p. 56), are not the controlling words in determining the applicability of the exemption during the off season. The language of the section is clear that the exempt employees must be employed in a "place" where the employer is engaged in one of the processing operations. But it is not enough that the "place" is devoted to activities related in some way, or necessary, to processing which may ultimately take place; it is also essential that at the time these activities occur, the employer is engaged in processing. During the "off season," however, when processing operations

are completely and definitely suspended for a period of three months, it is stretching the statutory language considerably to conclude that the processing operations are being engaged in by appellant. See *Maisonet v. Central Coloso, Inc.*, 2 W. H. Cases 753, 6 Labor Cases (C. C. H.) ¶61,337 (D. P. R.) not officially reported. In the *Maisonet* case the issue was squarely presented whether the employees were entitled to receive overtime pay during the dead season. The court, in holding that the exemption was inapplicable, since their employer was not engaged in processing at that time, noted that the economic conditions with which the exemption is supposed to be concerned do not obtain during the dead season, and that the mill could easily spread employment sufficiently during that season so as to avoid the necessity of overtime work. To the same effect, see *Heaburg v. Independent Oil Mill*, 46 F. Supp. 751, 754 (W. D. Tenn.), in which the court pointed out that "the 'dormant' season activities \* \* \* such as maintenance, repair, clerical and sales work, while incidental to and connected with the defendant's business of the 'processing of cottonseed' is not 'processing' within the intent of the Act and is not sufficient to bring the employer within the exemption 7 (c) during such period." See also *Abram v. San Joaquin Cotton Oil Co.*, 49 F. Supp. 393 (S. D. Calif.).

As in the cases cited above, appellant's three-month "off season" is a period devoted to repair and maintenance work on a vast scale, designed to safeguard its capital investment and for the installation of improvements (97 F. Supp. at 208) as well as to insure the uninterrupted functioning of the mill during the harvest season. The assertion by appellant (br., p. 55) that the Section 7 (c) exemption is a year around exemption is not inconsistent with the

position that "off season" work is nonexempt, for it is clearly implicit in the language of the exemptions that they are based on the premise that processing operations are being conducted during the entire year. If they are, then the exemption is an "absolute" year around exemption. But where, as here, they are not, then the exemption is applicable, in the language of the provision, only during such seasons as the employer is engaged in processing operations.

### III

**When an employee in the same workweek performs both work exempt under either Section 13 (a) (6) or Section 7 (c) and covered nonexempt work, he should receive the minimum wage and overtime benefits of the Act**

The Secretary believes that the decision below is correct in holding that an employee is entitled to the minimum wage and overtime benefits of the Act for work performed in any workweek in which he performs both exempt and covered nonexempt work. Appellant's contention that "Congress intended the exemption to apply to an employee in any workweek in which he does not devote a *substantial part* of his time to an activity not exempt" (br., p. 77), is directly contrary to the firmly established rule of statutory construction that exemptions from remedial legislation are to be strictly construed. *Phillips Co. v. Walling*, 324 U. S. 490; *Consolidated Timber Co. v. Womack*, 132 F. 2d 101 (C. A. 9); *Fleming v. Hawkeye Pearl Button Co.*, 113 F. 2d 52 (C. A. 8).

Equally lacking in merit is appellant's other contention that a denial of a tolerance for nonexempt work defeats the purpose of the exemption. Sections 13 (a) (6) and 7 (c) exempt not only those directly engaged in the operations specifically mentioned, but also others whose work is "incident to



or in conjunction with" such operations (Section 13 (a) (6)) or who perform incidental work in the same place of employment (Section 7 (c)). Thus, both the type of work for which the exemption is designed and the tolerance for related work are stated with particularity. There is, therefore, no occasion to broaden these exemptions by a further tolerance allowance. Furthermore, to do so would contravene the principle well established under this Act that "Such specificity in stating exemptions strengthens the implication that employees not thus exempted \* \* \* remain within the Act." *Powell v. United States Cartridge Co.*, 339 U. S. 497, at 516. See also *Addison v. Holly Hill Co.*, 322 U. S. 607, at 617: "Exemptions made in such detail preclude their enlargement by implication."

In refusing to "extend an exemption to other than those plainly and unmistakably within its terms and spirit" (*Phillips Co. v. Walling*, 324 U. S. 490, 493), the courts have uniformly refused to interpret exemptions in such a manner as to exempt activities which Congress obviously did not intend to exclude from the scope of the Act. The problem has usually arisen, as in the instant case, where both exempt and non-exempt activities are involved. Where exemptions depend on the particular duties performed by employees, the performance of both exempt and non-exempt activities by an employee in the same workweek results in the loss of the exemption. *McComb v. Puerto Rico Tobacco Marketing Coop Assn.*, 80 F. Supp. 953, aff'd 181 F. 2d 697 (C. A. 1); *North Shore Corp. v. Barnett*, 143 F. 2d 172 (C. A. 5); *Anderson v. Manhattan Lighterage Corp.*, 148 F. 2d 971 (C. A. 2) certiorari denied, 326 U. S. 722; *McComb v. Del Valle*, 80 F. Supp. 945 at 951 (D. P. R., 1948); *Shain v. Armour & Co.*, 50 F. Supp. 907 (W. D.



Ky.); *Walling v. DeSoto Creamery & Produce Co.*, 51 F. Supp. 938 at 943 (D. Minn.); *Fleming v. Swift & Co.*, 41 F. Supp. 825 (N. D. Ill.) affirmed, 131 F. 2d 249 (C. A. 7); *Walling v. Peacock Corp.*, 58 F. Supp. 880, 883 (E. D. Wis.); *Sykes v. Lockmann*, 156 Kan. 223, 132 P. 2d 620 certiorari denied, 319 U. S. 753; *Jordan v. Stark Bros. Nurseries*, 45 F. Supp. 769; *Walling v. Bridgeman-Russell*, 2 W. H. Cases 785 (D. Minn.) 6 Labor Cases (C. C. H.), ¶61,422 (not officially reported); *Loeb v. Ideal Packing Co.*, 7 Wage Hour Rept. 397, 8 Labor Cases (C. C. H.) ¶62,150 (Wis. C. C., Mil. Co., 1944); *Gaskin v. Clell Coleman & Sons*, 5 Wage Hour Rept. 581 (Ky. C. C. Mercer Co., 1942).

The operation of the above rule in a case involving the Section 7 (c) exemption is well illustrated by the decision in *Shain v. Armour & Co.*, *supra*. Although the major part of the plant's activities were devoted to the processing of butter and the employer therefore contended that all of his employees were exempt, only those employees "as devote their time *exclusively* to the first processing of cream into butter" were held to be within the exemption (6 Wage Hour Rept. 715). [Italics supplied.] And, the court specifically denied the exemption to employees who "devote part of their time during the workweek to duties other than the first processing of cream into butter" (*ibid*). Similarly, in *Walling v. Bridgeman-Russell*, *supra*, the Section 7 (c) exemption was only deemed applicable to employees "who perform exclusively the operations described in this Section" (2 W. H. Cases at 790), and once again, the exemption was specifically denied if "during any part of the workweek, the employee performs duties which do not fall within the scope of the exemption" (*ibid*). To the same effect in additional cases involving the Section 7 (c)

and Section 13 (a) (6) exemptions, see *McComb v. Puerto Rico Tobacco Marketing Coop. Assn.*, *supra*; *McComb v. Del Valle*, *supra*; *Fleming v. Swift & Co.*, *supra*; *Jordan v. Stark Bros. Nurseries*, *supra*; *Walling v. DeSoto Creamery & Produce Co.*, *supra*; *Walling v. Peacock Corp.*, *supra*; *Sykes v. Lockmann*, *supra*; and *Loeb v. Ideal Packing Co.*, *supra*. For similar rulings with respect to other exemptions, see *North Shore Corp. v. Barnett*, 143 F. 2d 172 (C. A. 5) (employee engaged as telephone switchboard operator within meaning of Section 13 (a) (11), who also performed other duties of a nonexempt nature); *Anderson v. Manhattan Lighterage Corp.*, 148 F. 2d 971 (C. A. 2) certiorari denied, 326 U. S. 722. See also *Wabash Radio Corp. v. Walling*, 162 F. 2d 391, 394 (C. A. 6).

Thus, the courts have recognized that if more than lip service is to be paid to the principle that "any exemption from [this] humanitarian and remedial legislation must \* \* \* be narrowly construed" and not extended "to other than those plainly and unmistakably within its terms and spirit" (*Phillips Co. v. Walling*, 324 U. S. 490, 493), exemptions cannot be held applicable to an employee or an employer simply because he engages in some exempt work if he also engages in other work which Congress clearly intended to subject to the statutory standards. Any other interpretation would open the door wide to evasion of the purpose of the Act to eliminate substandard labor conditions. It would result in absorbing into the exemptions parts of industries and activities plainly covered by the Act, simply because the same employees or employers happened to engage in several kinds of activities.

The position taken by the courts in the foregoing cases and by successive administrations over a period

of years (see Interpretative Bulletin No. 14, par. 37, p. 22) accords with the evident intent of Congress in defining with extraordinary particularity the scope of the exemptions here in question. Congress did not merely exempt by Section 13 (a) (6) employees "employed in agriculture." It went further, and, in Section (3) (f) gave a very detailed definition of agriculture which included not only traditionally agricultural activities but also "any practices \* \* \* performed by a farmer or on a farm as an incident to or in conjunction with such farming operations." This language in itself provides a substantial tolerance for activities which are not of a strictly agricultural nature. In addition, Congress provided other exemptions for related processing activities in Sections 7 (c) and 13 (a) (10) of the Act. The legislative history indicates that these exemptions were considered together and were intended to be a comprehensive and exclusive list of the activities in this field which Congress desired to exempt. As the courts have also emphasized, all the sections relating to these exemptions "are in *pari materia* and must be construed together to form a consistent whole, if possible." *Bowie v. Gonzalez*, 117 F. 2d 11. Applying these established principles, it seems clear that the detailed language of the statute is so explicit with regard to the scope of the exemption for employees employed in agriculture that no additional tolerance for nonagricultural work can be justified if the intention of Congress is to be given effect.

The situations cited by appellant where the Administrator has allowed a tolerance for nonexempt work are distinguishable from those presented by the exemptions provided in Sections 7 (c) and 13 (a) (6) which are involved in this case. The cases cited in footnote 1 in Appendix E to appellant's brief deal

with the Section 13 (a) (1) exemption which expressly grants the Administrator the power to define by regulation the exempt classifications which are merely identified in the Act only in the most general terms. As the tolerances are expressly provided in the regulation, no question of judicial interpretation is presented, and the cases cited by appellant in connection therewith are not in point.

The other exemptions cited by appellant where the Administrator has allowed and the courts have approved a tolerance for nonexempt work, are cases where the exempt occupation is designated only by an undefined word, or phrase rather than by a precise definition such as is provided in Section 3 (f) and in Section 7 (c). As it is felt that those exemptions were intended to apply to the typical situations or employees designated, the related activities typically found in those situations and occupations should not be regarded as defeating those exemptions. Thus Section 13 (a) (2), cited by appellant in footnote 48 on page 77 exempts employees employed in a "retail \* \* \* establishment." Such establishments generally make a few nonretail sales. Consequently a tolerance has been held appropriate. This explains the decision in *Northwestern Hanna Fuel Co. v. McComb*, 166 F. 2d 932 (C. A. 8); *Harris v. Hammond*, 145 F. 2d 333 (C. A. 5), certiorari denied, 324 U. S. 859; and *Brown v. Minngas Co.*, 51 F. Supp. 363 (D. Minn., 1943).

The Secretary is of the opinion that the tolerance specifically provided by the particularized language of the agricultural exemptions need not be broadened to accomplish the purposes of these exemptions, whereas the tolerances permitted in certain other sections are necessary to give substance to those sections.



valid, because the [52] Commissioner of Patents did not cause a proper examination to be made as to the alleged new invention or discovery purportedly defined by said Letters Patent, and, had such examination been made properly, it would have appeared that the applicant for said Letters Patent was not entitled thereto, and said Letters Patent would not have been issued; and said Commissioner of Patents exceeded his legal authority in granting and issuing said Letters Patent.

#### XVII. Invalidity for Aggregation

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because the alleged inventions purportedly defined by said Letters Patent and said claims, and each of them, are not in fact inventions or combinations but are mere aggregations of unpatentable and old elements.

#### XVIII. Invalidity for Insufficient Disclosure

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because, for the purpose of deceiving the public, the description and specification filed in the Patent Office by the applicant for said Letters Patent were made to contain less than the whole truth relative to the alleged invention by said applicant; because the patentee and Plaintiff has, since long prior to the filing of this suit, known that said Letters Patent were defective and inoperative, and that all of the claims thereof were and are invalid and void for including more than the ap-



plicant had a right to claim, and because they were and are vague, indefinite, and functional; and because the patentee and Plaintiff has failed to apply for reissue patent and failed to file disclaimers in the manner provided by law with respect to said Letters Patent, and the Plaintiff [53] has purposely refrained from applying for reissue patent and filing disclaimers in an attempt to extend the alleged monopoly of the Letters Patent in suit to cover more than the applicant had a right to claim, and to cover unpatented commodities, all contrary to public policy, public interest, and the law.

#### XIX. Invalidity for Different Invention

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because the inventions purportedly covered by said claims are substantially different from any invention indicated, suggested, or described in the original application therefor.

#### XX. Invalidity for Claiming Function and Result

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because each of said claims is functional; because each of said claims describes the alleged invention in terms of function and result; because each of said claims describes the function of a structure, to the exclusion of any sufficient structural definition; because each of said claims attempts to patent a function or result; because each of said claims employs conveniently functional language at the exact point of alleged novelty; and

because each of said claims is but an inaccurate suggestion of the functions of the structure purported to be defined.

### XXI. Invalidity for Exhausted Combination

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because each of said claims includes more than the applicant had a right to claim and more than was invented, and each of said claims defines an old combination of elements, whereas the invention [54] (if any were involved) resided in the improvement of only one of said elements, or less than all of said elements, of an old combination whose construction, operation, and result were otherwise unchanged.

### XXII. Laches and Estoppel

Plaintiff, since long prior to the filing of this suit, has had full knowledge of the devices sold by this Defendant and complained of as an infringement herein, but delayed the filing of this suit, whereby Plaintiff is guilty of such laches and has permitted this Defendant, and those acting in concert with it, to rely upon the lack of activity by, and laches of, the Plaintiff, so that Plaintiff is estopped to maintain this action and to recover any damages or injunctive relief against this Defendant.

### XXIII. Non-Infringement for Limitation by Prior Art

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, not infringed by any act done, or intended to be done,

by this Defendant, because, in view of the prior art existing at and before the date of the alleged invention of the subject matter of each of said claims, said claims, and each of them, cannot be given an interpretation, meaning, or scope to cover or include any devices sold by this Defendant without rendering such claim or claims invalid as covering or embracing that which was old and well known prior to said alleged invention subjection of said patent.

#### XXIV. File Wrapper Estoppel

While the application for said United States Letters Patent No. 2,286,479 was pending in the Patent Office, the applicant therefor so limited and confined the claims of said application, under the requirements of the Commissioner of Patents or [55] otherwise, that Plaintiff cannot now seek or obtain a construction of any of the claims of said Letters Patent sufficiently broad to cover any devices sold by this Defendant.

Wherefore, Defendant Air-Maze Corporation prays:

(1) That United States Letters Patent No. 2,286,479, and each of the claims thereof, be declared not infringed by any act of this Defendant;

(2) That, as a protection to this Defendant against future suit thereon and as a protection to the public at large from suit on invalid patents, United States Letters Patent No. 2,286,479, and each of the claims thereof, be held invalid, void, and unenforceable, and that a declaratory judgment to such effect be made and entered herein;

(3 That Plaintiff's Complaint be dismissed with prejudice; and

(4) That this Defendant have judgment against Plaintiff for costs herein and attorneys' fees, and such other and further relief as to the Court may seem meet and just.

Dated: At Los Angeles, California, this 24th day of July, 1950.

OVERTON, LYMAN, PLUMB, PRINCE  
& VERMILLE—CARL J. SCHUCK,  
HARRIS, KIECH, FOSTER & HARRIS  
WARD D. FOSTER,  
FORD HARRIS, JR.,

/s/ By FORD HARRIS, JR.,

Attorneys for Defendants.

[Endorsed]: Filed July 28, 1950. [56]

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[Title of District Court and Cause]

FIRST AMENDED ANSWER OF DEFEND-  
ANTS, JULES D. GRATIOT AND AIR-  
MAZE CORPORATION

Defendants, Jules D. Gratiot and Air-Maze Corporation, for their answer to the Complaint herein, admit, deny, and allege as follows:

I. Jurisdiction

Answering Paragraph I of the Complaint, Defendants admit the allegations thereof.

## II. Plaintiff

Answering Paragraph II of the Complaint, Defendants state that they are without knowledge or information sufficient to form a belief as to the truth of any of the averments thereof. [88]

## III. Defendant Jules D. Gratiot

Answering Paragraph III of the Complaint, Defendant Jules D. Gratiot admits the allegations thereof.

## IV. Defendant Air-Maze Corporation

Answering Paragraph IV of the Complaint, Defendant Air-Maze Corporation admits that it is a corporation organized and existing under the laws of the State of Delaware; and Defendants deny each and every other allegation thereof.

## V. Title to Patent

Answering Paragraph V of the Complaint, Defendants admit that on June 16, 1942, United States Letters Patent No. 2,286,479 were issued to Morrill N. Farr; deny that said Letters Patent were duly or legally issued; deny that said Letters Patent were issued for an invention in an Air Filter Panel or for any other invention; and state that they are, and each of them is, without knowledge or information sufficient to form a belief as to the truth of each and every of the other averments of said paragraph.

## VI. Infringement by Defendant Jules D. Gratiot

Answering Paragraph VI of the Complaint, Defendant Jules D. Gratiot denies, and Defendant



Air-Maze Corporation upon information and belief denies, each and every allegation thereof.

VII. Infringement by Defendant  
Air-Maze Corporation

Answering Paragraph VII of the Complaint, Defendant Air-Maze Corporation denies, and Defendant Jules D. Gratiot upon information and belief denies, each and every allegation thereof. [89]

VIII. Notice

Answering Paragraph VIII of the Complaint, Defendants state that they are, and each of them is, without knowledge or information sufficient to form a belief as to the truth of any of the allegations thereof.

As additional and separate defenses, defendants allege as follows:

IX. Non-Infringement

Defendants have not, and neither of them has, within six (6) years preceding the filing of the Complaint herein and prior to the filing thereof, done any act or thing, or threatened to do any act or thing, infringing any of the claims of United States Letters Patent No. 2,286,479.

X. Invalidity for Non-Compliance with R.S. 4886

The alleged invention or discovery claimed in United States Letters Patent No. 2,286,479 was not patentable to the alleged inventor named therein, under the provisions of Section 4886 of the Revised Statutes of the United States (35 U.S.C.

31), and, therefore, said patent is, and all of its claims are, invalid and void.

## XI. Invalidity for Lack of Novelty

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid, because each of the alleged inventions described thereby was patented and described in printed publications in this and foreign countries before the alleged invention or discovery thereof by the applicant for said patent, or more than two (2) years prior to the filing of the [90] application for said patent, such patents and publications including the following:

U.S. Patent No.	Patentee	Date Granted
438,464	B. S. Benson.....	October 14, 1890
569,203	T. B. Hunt.....	October 13, 1896
838,602	J. Zellweger.....	December 18, 1906
913,802	A. H. Barker.....	March 2, 1909
1,118,237	E. D. St. Cyr.....	November 24, 1914
1,262,317	J. H. V. Finney, et al.....	April 9, 1918
1,267,023	U. Wedge.....	May 21, 1918
1,548,839	P. P. Henshall.....	August 11, 1925
1,566,088	O. V. Greene.....	December 15, 1925
1,576,121	J. J. Preble.....	March 9, 1926
1,729,135	H. W. Slauson.....	Septmeber 24, 1929
1,756,758	F. S. Orem.....	April 29, 1930
1,794,115	L. Klaff.....	February 24, 1931
1,834,534	W. L. Richards, et al.....	December 1, 1931
1,841,250	T. Merryweather.....	January 12, 1932
1,948,363	J. B. Taylor.....	February 20, 1934
1,949,205	G. E. Herring, et al.....	February 27, 1934
2,019,186	H. S. Kaiser.....	October 29, 1935
2,065,871	W. Rehfus.....	December 29, 1936
2,079,297	F. Manning.....	May 4, 1937
2,108,283	R. L. Drew, et al.....	February 15, 1938
2,162,805	M. N. Farr.....	June 20, 1939

British Patent No.	Patentee	Date Granted
17,971	Vollman .....	1902
182,201	Graefe .....	1921
10,583	Grove .....	1899
125,691	Barclay .....	1918
234,516	Budil .....	1925
197,939	Budil .....	1923
24,467	Kirkham, Hulett & Chandler Ltd.....	1904
6,452	Heenan .....	1909
6,850	Defays .....	1905
12,659	Redman .....	1904
13,222	Row .....	1904
23,546	Burstall .....	1907
23,789	Whittaker & Co.....	1912
24,382	Whittaker & Co.....	1912
28,656	Heenan .....	1909
211,756	Moller .....	1923
264,896	Dine .....	1925
311,831	Aivaz .....	1927
324,034	Schrempp .....	1928

French Patent No.	Patentee	Date Granted
667,362	Saulny .....	1929
737,636	Heather .....	1932
739,956	Niestle .....	1932
803,101	Basset .....	1936
808,696	C. F. Burgess Laboratories.....	1936

Swiss Patent No.	Patentee	Date Granted
142,432	Benteli-Hussy .....	1930
181,200	Sulzer .....	1936

German Patent No.	Patentee	Date Granted
175,579	Defays, et al.....	1906
472,749	L'Air Liquide .....	1929
526,256	Richter .....	1931
537,186	Deutsche Luftfilter .....	1931
539,171	Deutsche Luftfilter .....	1929
567,012	Schrempp .....	1932

and others, of which Defendants are not at present advised, but beg leave to add hereto by proper amendment to this, their First Amended Answer,

together with details thereof when such information is obtained.

## XII. Invalidity for Lack of Invention

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid, because the alleged inventions or discoveries purportedly described and claimed in said claims were merely the result of the exercise of the ordinary faculties of reasoning aided by the special knowledge and facility of manipulation which are acquired through the habitual and intelligent practice of the art, and were not the result of that inventive faculty which it is the purpose of the Constitution and the Patent Laws to encourage and reward, and involve nothing more than the exercise of mere mechanical skill in view of the state of the art as known at the time of, and long prior to, the alleged inventions or discoveries thereof by the applicant for said Letters Patent, said state of the art including the prior patents and publications referred to in the preceding section and the instances of prior knowledge, prior invention, and prior public use and sale referred to in Paragraphs XIII, XIV, and XV hereof and the subject matter of such instances.

## XIII. Invalidity for Prior Knowledge and Use

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid, because the alleged inventions purportedly defined by said claims were known [93] to, or used by, others in the United States prior to the alleged inventions or discoveries thereof by the ap-

plicant therefor, including those inventors named in the prior patents and the assignees named in said patents, residing at the residences in this country stated in said patents, such use occurring at such residences, set forth in Paragraph XI hereof, and including the following:

U. S. Patent No. 2,252,242. Patentee, Everett N. Wood. Date of Patent, August 12, 1941. Name and Residence of Person Having Prior Knowledge and Use, As stated in patent. Place of Use, Patentee's residence.

U. S. Patent No. 2,286,480. Patentee, Morrill N. Farr. Date of Patent, June 16, 1942. Name and Residence of Person Having Prior Knowledge and Use, As stated in patent. Place of Use, Los Angeles, California.

Name and Residence of Person Having Prior Knowledge and Use	Place of Use
Richard S. Farr,	
Los Angeles, California.....	Los Angeles, California
M. Spencer Farr	
Los Angeles, California.....	Los Angeles, California
Personnel of Safeway Stores	
Barstow, California.....	Barstow, California
Mohler Brothers	Security Bldg.
2280 White Avenue	1131 N. Highland Avenue
Pasadena, California.....	Los Angeles, California
J. G. Ridland	
147 N. Irving	147 N. Irving
Los Angeles, California.....	Los Angeles, California
Electrical Equipment Co.	
424 N. Central Avenue	424 N. Central Avenue
Phoenix, Arizona.....	Phoenix, Arizona
Personnel of Safeway Stores	
Canoga Park, California.....	Canoga Park, California
Personnel of Safeway Stores	
Indio, California.....	Indio, California
Personnel of Safeway Stores	
Blythe, California.....	Blythe, California
Personnel of Safeway Stores	
Palm Springs, California.....	Palm Springs, California



Name and Residence of Person Having Prior Knowledge and Use	Place of Use
Robert R. Roth 826 N. Third Avenue Phoenix, Arizona.....	Phoenix, Arizona
Bernard W. Keller P. O. Box 456 Barstow, California.....	Barstow, California
John Doe Thaxter Safeway Stores Los Angeles, California.....	Los Angeles, California
J. D. Pringle Safeway Stores Los Angeles, California.....	Los Angeles, California
Arthur Park Bramble Const. Co. Los Angeles, California.....	Los Angeles, California
J. F. Butler Bramble Const. Co. Palm Springs, California.....	Palm Springs, California
F. J. Head 6015 W. 86th Street Los Angeles, California.....	Los Angeles, California
Max Knapp Safeway Stores Canoga Park, California.....	Canoga Park, California
Emerson Eames 1143 Diamond Avenue Pasadena, California.....	Pasadena, California

together with all vendees of devices constructed according to said United States Letters Patent No. 2,286,480, which devices were sold by M. N. Farr & Sons, the employees of the purchasers of such devices hereinbefore listed, and the individuals who installed and serviced such devices, all of whose names and addresses are better known to Plaintiff herein than to these [96] Defendants, but whose names and addresses these Defendants seek leave to insert by amendment herein when ascertained.

## XIV. Invalidity for Prior Invention

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid, because the applicant for said Letters Patent was not the original or first inventor of any material or substantial part of the things purported to be patented thereby, and the same thing or things in all material and substantial respects had, prior to the alleged inventions or discoveries thereof by said applicant, been invented (if there be any patentable invention defined by any of said claims) by others, including the applicants for the patents set forth in Paragraph XI hereof, residing at the places of residence stated in said patents, and the following:

U. S. Patent No. 2,252,242; Patentee, Everett N. Wood; date granted, Aug. 12, 1941; date application filed, Feb. 13, 1939; place of residence, as stated in the patent; and others whose names and addresses are not at present known to these Defendants, but which Defendants pray leave to add hereto by proper amendment to this First Amended Answer when ascertained.

## XV. Invalidity for Prior Public Use and Sale

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid, because the alleged inventions purportedly defined by said claims were in public use or on sale in this country for more than two (2) years prior to the application therefor, such sales being made by the following [97] vendors to the following

vendees, whose names and addresses are hereinafter set forth:

## Vendor—Address

M. N. Farr & Sons  
1000 Alhambra Avenue  
Los Angeles, California

M. N. Farr & Sons  
1000 Alhambra Avenue  
Los Angeles, California

M. N. Farr & Sons  
1000 Alhambra Avenue  
Los Angeles, California

M. N. Farr & Sons  
1000 Alhambra Avenue  
Los Angeles, California

M. N. Farr & Sons  
1000 Alhambra Avenue  
Los Angeles, California

M. N. Farr & Sons  
1000 Alhambra Avenue  
Los Angeles, California

M. N. Farr & Sons  
1000 Alhambra Avenue  
Los Angeles, California

M. N. Farr & Sons  
1000 Alhambra Avenue  
Los Angeles, California

## Vendee—Address

Safeway Stores  
Barstow, California

Mohler Brothers  
2280 White Avenue  
Pasadena, California

J. G. Ridland  
147 N. Irving  
Los Angeles, California

Electrical Equipment Co.  
424 N. Central Avenue  
Phoenix, Arizona

Safeway Stores  
Canoga Park, California

Safeway Stores  
Palm Springs, California

Safeway Stores  
Blythe, California

Safeway Stores  
Indio, California

## XVI. Invalidity for Non-Compliance with R.S. 4888

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid, because said [98] claims fail to comply with Section 4888 of the Revised Statutes of the United States (35 U.S.C. 33) in failing to point out particularly and claim distinctly the part, improvement, or combination which the applicant for said Letters Patent claimed in his invention or discovery, and because such applicant failed to file in

the Patent Office a written description of said invention (if any there were) and of the manner and process of making, constructing, compounding, and using it in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which the invention appertains or with which it is most nearly connected to make, construct, compound, and use the same, and said Letters Patent are ambiguous, and each of the claims thereof is nebulous.

#### XVII. Invalidity for Improper Examination

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid, because the Commissioner of Patents did not know that the device of United States Letters Patent No. 2,286,480 was the subject of invention prior to the alleged invention of the device sought to be patented in said United States Letters Patent No. 2,286,479, and was the subject of prior knowledge and use by others in this country prior to the alleged invention of the subject matter of said Letters Patent, and was the subject of public use and sale in this country for more than two (2) years prior to the application for said Letters Patent, and did not cause a proper examination to be made as to the alleged new invention or discovery purportedly defined by said Letters Patent, and, had such examination been made properly, it would have appeared that the applicant for said Letters Patent was not entitled thereto, and said Letters Patent would not have been issued; and said Commissioner of Patents exceeded his legal authority in granting and issuing said Letters Patent. [99]



## XVIII. Invalidity for Aggregation

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because the alleged inventions purportedly defined by said Letters Patent and said claims, and each of them, are not in fact inventions or combinations but are mere aggregations of unpatentable and old elements.

## XIX. Invalidity for Insufficient Disclosure

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because, for the purpose of deceiving the public, the description and specification filed in the Patent Office by the applicant for said Letters Patent were made to contain less than the whole truth relative to the alleged invention by said applicant; because the patentee and Plaintiff have, since long prior to the filing of this suit, known that said Letters Patent were defective and inoperative, and that all of the claims thereof were and are invalid and void for including more than the applicant had a right to claim, and because they were and are vague, indefinite, and functional; and because the patentee has failed to apply for reissue patent and failed to file disclaimers in the manner provided by law with respect to said Letters Patent, and the patentee has purposely refrained from applying for reissue patent and filing disclaimers in an attempt to extend the alleged monopoly of the Letters Patent in suit to cover more than the applicant had a right to claim, and to cover unpatented commodities, all contrary to public policy, public interest, and the law.

## XX. Invalidity for Different Invention

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because [100] the inventions purportedly covered by said claims are substantially different from any invention indicated, suggested, or described in the original application therefor.

## XXI. Invalidity for Claiming Function and Result

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because each of said claims is functional; because each of said claims describes the alleged invention in terms of function and result; because each of said claims describes the function of a structure, to the exclusion of any sufficient structural definition; because each of said claims attempts to patent a function or result; because each of said claims employs conveniently functional language at the exact point of alleged novelty; and because each of said claims is but an inaccurate suggestion of the functions of the structure purported to be defined.

## XXII. Invalidity for Exhausted Combination

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid and void, because each of said claims includes more than the applicant had a right to claim and more than was invented, and each of said claims defines an old combination of elements, whereas the invention (if any were involved) resided in the improvement of only one of said elements, or less than all of said elements, of an old combination whose

construction, operation, and result were otherwise unchanged.

### XXIII. Laches and Estoppel

Plaintiff, since long prior to the filing of this suit, has had full knowledge of the devices sold by these Defendants and complained of as an infringement herein, but delayed the filing of this suit, whereby Plaintiff is guilty of such laches and has [101] permitted these Defendants to rely upon the lack of activity by, and laches of, the Plaintiff, so that Plaintiff is estopped to maintain this action and to recover any damages or injunctive relief against these Defendants.

### XXIV. Non-Infringement for Limitation by Prior Art

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, not infringed by any act done, or intended to be done, by these Defendants, because, in view of the prior art existing at and before the date of the alleged invention of the subject matter of each of said claims, and including the prior public use and public knowledge and instances of public use and sale of the humidifier and air filter devices by the persons and at the places listed in Paragraphs XIII and XV hereof, said claims, and each of them, cannot be given an interpretation, meaning, or scope to cover or include any devices sold by these Defendants without rendering such claim or claims invalid as covering or embracing that which was old and well known prior to said alleged invention subject to said patent.

## XXV. File Wrapper Estoppel

While the application for said United States Patent No. 2,286,479 was pending in the Patent Office, the applicant therefor so limited and confined the claims of said application, under the requirements of the Commissioner of Patents or otherwise, that Plaintiff cannot now seek or obtain a construction of any of the claims of said Letters Patent sufficiently broad to cover any devices sold by these Defendants.

## XXVI. Invalidity for Lack of Inventive Advance

All of the claims of said United States Letters Patent No. 2,286,479 are, and each of them is, invalid because of the [102] prior knowledge and use and the prior public use and prior public sale, earlier than the alleged invention of the subject matter of the Letters Patent in suit or more than two (2) years prior to the application therefor, as hereinbefore set forth, of that which was attempted to be patented in said Letters Patent or that which was so nearly like that which was so attempted to be patented as not to be distinguished therefrom by invention thereover.

## XXVII. Abandonment

The invention of the device accused as infringing Letters Patent No. 2,286,479 in suit (if there be any invention in such device), all rights to a patent thereon, and claims of the patentee, Morrill N. Farr, of said Letters Patent which might define Defendants' said accused device were abandoned by the said Morrill N. Farr and Plaintiff in the United States Patent Office, such acts of abandonment in-



cluding the following acts, events, and circumstances:

On July 22, 1939, Morrill N. Farr, the patentee of United States Letters Patent No. 2,286,479, filed in the United States Patent Office an application, Serial No. 285,904, for new and useful improvements in "Filters"; this application disclosed, described, and claimed a filter similar to the device made by Defendant Air-Maze Corporation, and accused herein as an infringing device; on October 7, 1939, the United States Patent Office rejected all of the claims of the above-mentioned patent application Serial No. 285,904; thereafter, all of the subject matter disclosed, defined, and claimed in the above mentioned application Serial No. 285,904 became abandoned for failure to prosecute the same before the United States Patent Office save for a single form of the device which was disclosed, described, and claimed in an application, Serial No. 327,833, filed April 4, 1940, for "Air Filter Panel", which resulted in United States Letters Patent No. 2,286,479 in suit, which was designated as a continuation of the above mentioned application Serial No. 285,904; and the description, disclosure, and claims relating to that form of filter like the accused device of Defendants herein was not transferred and continued from said abandoned application Serial No. 285,904 to the said continuation application Serial No. 327,833 but instead, that form of filter disclosed by Morrill N. Farr in Serial No. 285,904 and corresponding to the filter of Defendants accused in this action as infringement, was

abandoned, and no attempt was made thereafter by Morrill N. Farr to secure Letters Patent of the United States covering said abandoned disclosure.

### XXVIII. Intervening Rights

Plaintiff is estopped to assert infringement of said United States Letters Patent No. 2,286,479 by the devices made, used, or sold by these Defendants by reason of the fact that Plaintiff for a long period of time failed to assert any claim of infringement against these Defendants, and that Plaintiff never asserted a scope of the claims of said Letters Patent such as to cover the devices of Defendants herein complained of, until Defendant Air-Maze Corporation had made and sold large numbers of these devices, and by reason of the fact that said Morrill N. Farr and Plaintiff abandoned the invention of the Defendants' devices accused herein as infringing the Letters Patent in suit (if such devices involved any such invention) and all rights to a patent thereon and all rights to an interpretation of any claims of the patent in suit covering such devices by those acts set forth, and those events and circumstances set forth, in Paragraph XXVII hereof and hereby incorporated herein by reference; and these Defendants are therefore entitled to assert intervening rights against Plaintiff because of large investments made for the [104] manufacture, marketing, and sale of these devices during that period of time when Plaintiff was failing to assert the enlarged scope of the claims of said United States Letters Patent No. 2,286,479 for which Plaintiff is now contending.

Wherefore, Defendants pray:

(1) That United States Letters Patent No. 2,286,479, and each of the claims thereof, be declared not infringed by any act of these Defendants;

(2) That, as a protection to these Defendants against future suit thereon and as a protection to the public at large from suit on invalid patents, United States Letters Patent No. 2,286,479, and each of the claims thereof, be held invalid, void, and unenforceable, and that a declaratory judgment to such effect be made and entered herein;

(3) That Plaintiff's Complaint be dismissed with prejudice; and

(4) That these Defendants have judgment against Plaintiff for costs herein and attorneys' fees, and such other and further relief as to the Court may seem meet and just.

Dated: At Los Angeles, California, this 4th day of September, 1951.

OVERTON, LYMAN, PRINCE &  
VERMILLE

HYDE, MEYER, BALDWIN &  
DORAN, GEORGE S. BALDWIN  
HARRIS, KIECH, FOSTER &  
HARRIS

WARD D. FOSTER, FORD HARRIS, JR., DONALD C. RUSSEL

/s/ By FORD HARRIS, JR.

Attorneys for Defendants. [105]

[Endorsed]: Filed Sept. 17, 1951.

[Title of District Court and Cause]

## PLAINTIFF'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW AND JUDGMENT

Plaintiff submits the attached Findings of Fact and Conclusions of Law in place of those previously submitted in order to incorporate such of the objections and suggestions of defendants as are believed proper.

Findings 10, 11, 12 and 13 have been amended as suggested by defendants. Findings 19 and 23 and Conclusions of Law 3 and 5 have been amended as suggested by defendants. [106]

Defendants have proposed an addition to Finding 14 but this addition does not add any material fact to our proposed Finding 14.

Defendants proposed additional Finding 24 is believed improper for the reason that the evidence at the trial showed that Plaintiff's Exhibits 19, 20 and 21 were not air filters made and sold by Air-Maze Corporation but merely experimental models of air filters being tested in the Air-Maze laboratories.

Defendants proposed Finding 25 is believed incorrect the claims referred to not specifically reciting defendants' accused P-5 filter panel.

We have also revised our proposed Judgment in order to remove any award of attorneys fees. [107]

## FINDINGS OF FACT AND CONCLUSIONS OF LAW

This cause having come on to be heard before the Court, at the conclusion of the trial and of the oral



arguments presented on January 4, 1952, the Court having expressed its conclusion and opinion, the same by reference, together with and supplemented by the following Findings of Fact and Conclusions of Law, are hereby adopted by the Court as its Findings of Fact and Conclusions of Law pursuant to Rule 52 of the Rules of Civil Procedure: [108]

### Findings of Fact

1. The plaintiff, Farr Company, is a California corporation having its principal place of business in the City of Los Angeles, California, and is the owner of the entire right, title and interest in and to United States Letters Patent No. 2,286,479, claims 4, 5, 7 and 8 of which are in suit.

2. The defendant Jules D. Gratiot, is a resident of Los Angeles, California, and the defendant Air-Maze Corporation, is a Delaware corporation doing business within the Southern District of California, Central Division.

3. The Farr patent in suit discloses an air filter panel operating on the principle of impingement of particles on collecting surfaces, which collecting surfaces are wire screen members position so that the air is introduced along the planes of the members, and the wire screen members are corrugated to divide the panel in two dimensions into passages through the panel, which passages change abruptly in direction.

4. At the start of the operation of the air panels of the patent in suit portions of the air flow through the mesh of the screen members into the adjoining passages but as the panels become loaded with dust

the flow of air becomes more and more confined to flow through the passages.

5. Prior to the advent of the invention of the Farr patent in suit for many years there had been in commercial use air filter panels made of wire screen positioned so that the air was introduced perpendicular to the plane of the wire screens, and there had also been in commercial use for many years air filters made of paper positioned so that the air was [109] introduced along the planes of the paper but none of such air filters have the mode of operation or achieve the advantages of the Farr patent in suit.

6. The air filter panels of the Farr patent in suit combined the ability to provide a high efficiency in removing dust from air with a lower pressure drop than previous commercially built filters which pressure drop did not increase as rapidly as previously built commercial filters as the filter became loaded with dust, the air filter panel of the Farr patent in suit providing the further advantages of low cost of manufacture and low maintenance as well as ease of cleaning.

7. The public has recognized the value of the air filter panels of the Farr patent in suit. Beginning substantially immediately with the invention of the patent in suit the air filter panels of the Farr patent in suit have gone into commercial use at a steady and rapidly increasing rate, the patent in suit having a wide commercial success and being responsible for the development of a rapidly expanding business by the plaintiff, Farr Company.

8. The air filter panel described and covered by claims 4, 5, 7 and 8 of the Farr patent in suit is not disclosed in any of the prior art or prior uses pleaded and introduced in evidence by the defendants.

9. The Farr patent in suit does not disclose an aggregation but does disclose a new combination of old elements which co-operate together to provide not only advantages in the cleaning of the air but benefits in cost of manufacture, maintenance and upkeep. [110]

10. Devices shown in prior art patents such as Patent No. 2,252,242 to Wood, Defendants' Exhibit B, Tab 11; British Patent No. 24,467 to Kirkham, Defendants' Exhibit B, Tab 12; British Patent No. 13,222 to Row, Defendants' Exhibit B, Tab 13; and British Patent No. 211,756 to Moller, Defendants' Exhibit B, Tab 14, in which liquid is supplied continuously or intermittently so as to wash away any dust collected, are not filter panels operating on the principle of impingement of particles on collecting surfaces and do not remove dust by the same mode of operation referred to in Finding 4, or achieve the advantages of the Farr patent in suit.

11. Devices shown in the prior art patents such as Patent No. 1,729,135 to Slauson, Defendants' Exhibit B, Tab 5; Patent No. 2,019,186 to Kaiser, Defendants' Exhibit B, Tab 8; Patent No. 2,079,297 to Manning, Defendants' Exhibit B, Tab 9; Patent No.

2,252,242 to Wood, Defendants' Exhibit B, Tab 11; British Patent No. 211,756 to Moller, Defendants' Exhibit B, Tab 14, and French Patent No. 739,956 to Niestle, Defendants' Exhibit B, Tab 15, which employ solid sheets of material such as paper or mesh material which, when oiled and in use present a solid wall, do not possess the mode of operation referred to in Finding 4 or achieve the advantages of the Farr Letters Patent in suit.

12. Patent No. 1,118,237 to St. Cyr, Defendants' Exhibit B, Tab 1, discloses a gaseous fuel mixer and does not constitute an air filter panel which operates by the impingement of particles on collecting surfaces. The device of the St. Cyr patent is made with a fine metal gauze the crimps of which change direction only slowly because of the spiral wrapping of the gauze and do not provide passages which change abruptly in direction [111] as in the Farr patent in suit. The device of the St. Cyr patent is continually washed with a gaseous fuel mixture and is entirely enclosed. The device of the St. Cyr patent is not adapted to perform by the same mode of operation referred to in Finding 4 or achieve the advantages of the device of the Farr patent in suit.

13. The device of the French Patent No. 739,956 to Niestle, Defendants' Exhibit B, Tab 15, is a filter made of expanded sheets set at right angles to the intended flow of air rather than parallel as in the Farr patent in suit. When made of metal gauze and oiled the expanded sheets would present a solid wall. The French patent to Niestle does not operate by



the same mode of operation referred to in Finding 4 or achieve the advantages of the Farr patent in suit.

14. For many years prior to the invention of the Farr patent in suit the art, although familiar with air filters made of wire screen such as illustrated in Patent No. 1,566,088 to Greene, Defendants' Exhibit B, Tab 3, and paper filters such as illustrated in Patent No. 2,019,186 to Kaiser, Defendants' Exhibit B, Tab 8, and Patent No. 2,079,297 to Manning, Defendants' Exhibit B, Tab 9, expended great effort and money in the scientific study and testing of different air filter panels without the air filter panel of the Farr patent being suggested thereby.

15. The marked commercial success of the Farr patent in suit and the failure of the prior art to produce an air filter having the mode of operation or achieving the advantages of the Farr patent in suit, while not sufficient alone to establish invention is an important factor to support the conclusion that the combination of the claims 4, 5, 7 and 8 of the Farr patent in suit represents an invention and not mere mechanical skill. [112]

16. Prior to and at the time of the filing of the bill of complaint herein defendant Jules D. Gratiot was doing business within the Southern District of California, Central Division, by selling the P-5 air filter panels manufactured by the defendant Air-Maze Corporation, which P-5 air filter panels are like Plaintiff's Exhibit 12 and described and illustrated in Plaintiff's Exhibit 4.

17. That the activities of the defendant Jules D. Gratiot in selling the P-5 air filter panels manufactured by defendant Air-Maze Corporation, were more than a mere solicitor of sales, and the defendant Air-Maze Corporation was doing business within this District.

18. That the defendant Air-Maze Corporation has conducted the entire defense of this case, has hired the attorneys who have conducted the defense for both defendants, has exclusively controlled the progress of this litigation, has agreed to pay all expenses of the defense of this suit including attorneys' fees and costs, and has agreed to indemnify the defendant Jules D. Gratiot from any damage resulting from any judgment against said Jules D. Gratiot.

19. The said P-5 air filter panels manufactured by the defendant Air-Maze Corporation and sold by the defendant Jules D. Gratiot are essentially and basically the same as the air filter panels of the Farr patent in suit.

20. Said P-5 air filter panel introduces the air along the plane of the filtering elements, breaks the air up into passages having abrupt angles creating turbulence in the air to force the air through the mesh of the screen. [113]

21. Claims 1, 2, 3 and 6 of the patent in suit are expressly limited to the use of flat screen wire between the corrugated or crimped screen wire while claims 4, 5, 7 and 8 of the Farr patent in suit are not limited to the use of such flat screen wire and

were not intended by the Patent Office or by the patentee Farr to be so limited.

22. Claims 4, 5, 7 and 8 of the Farr patent in suit are not limited, and were not intended by the Patent Office or the patentee Farr to be so limited, to the use of crimped wire screen all of which had the angles of the crimp extending in the same direction.

23. The filing of the application Serial No. 327,833 which issued into the Farr patent in suit as a continuation of the earlier application Serial No. 285,904 did not abandon any of the forms of air filter shown in application Serial No. 285,904 and the file wrappers of applications Serial Nos. 285,904 and 327,833 do not contain any abandonment or estoppel such as would prevent claims 4, 5, 7 and 8 of the Farr patent in suit from including the said P-5 air filter panels manufactured by the defendant Air-Maze Corporation and sold by the defendant Jules D. Gratiot.

### Conclusions of Law

I. The Farr Letters Patent in suit No. 2,286,479 was duly and legally issued on June 16, 1942 and plaintiff Farr Company is the owner of the entire right, title and interest in and to the said Letters Patent with any and all rights of action, claims or demands arising out of or accruing from past infringement thereof. [114]

II. Claims 4, 5, 7 and 8 of the Farr Letters Patent in suit are good and valid in law and cover a new and meritorious invention.

III. Defendant Jules D. Gratiot by the sale of the P-5 air filter panels, and the defendant Air-Maze Corporation by the manufacture and sale of the said P-5 air filter panels exemplified by Exhibit 12, have infringed each of Claims 4, 5, 7 and 8 of the Farr Letters Patent in suit No. 2,286,479.

IV. That the defendant, Air-Maze Corporation, for venue purposes, is a resident of the Southern District of California, Central Division.

V. The plaintiff is entitled to a judgment for an injunction and accounting with costs as prayed for in the bill of complaint herein filed.

VI. That the accounting should be stayed pending appeal by defendants from the judgment entered herein and until said appeal is determined, dismissed, or until the time for such appeal has lapsed.

/s/ PEIRSON M. HALL,

United States District Judge.

Dated Feb. 26, 1952

Approved as to form as provided in Rule 8.

LYON & LYON

/s/ By RICHARD F. LYON,

Attorneys for Plaintiff. [115]

[Endorsed]: Filed Feb. 26, 1952.



In the United States District Court, Southern  
District of California, Central Division

Civil Action No. 9759-PH

FARR COMPANY, a corporation,

Plaintiff,

vs.

JULES D. GRATIOT and AIR-MAZE  
CORPORATION,

Defendants.

### JUDGMENT

This cause having come on to be heard and the Court having made and entered its Findings of Fact and Conclusions of Law pursuant to Rule 52 of the Rules of Civil Procedure, It Is Hereby Adjudged and Decreed as follows:

(1) Plaintiff is the owner of the entire right, title and interest in and to Letters Patent No. 2,286,479 granted June 16, 1942, to Morrill N. Farr for Air Filter Panel, together with all rights of action for past infringement thereof. [117]

(2) That said Letters Patent and Claims 4, 5, 7 and 8 thereof are good and valid in law.

(3) That plaintiff have judgment on its complaint for infringement of Letters Patent No. 2,286,479 as prayed for.

(4) That a perpetual injunction issue out of and under the seal of this Court restraining the defendant Jules D. Gratiot, his officers, agents, servants,

employees and attorneys, and those persons in active concert or participation with him, and the defendant Air-Maize Corporation, its officers, agents servants, employees and attorneys, and those persons in active concert or participation with it, from making, using or selling or causing to be made, used or sold, or offering or threatening to make, use or sell, or contributing to the manufacture, use or sale of the air filter panels patented in and by said Letters Patent No. 2,286,479, and particularly claims 4, 5, 7 and 8 thereof, reading as follows:

“4. A filtering panel operating on the principle of impingement of particiles on collecting surfaces, which includes a plurality of mesh screening members extending in the general direction of the intended flow of the medium to be filtered, said members being constructed and arranged so as to effect a multiple subdivision of the panel in both dimensions perpendicular to the general direction of flow of the medium to be filtered, thereby forming passages extending through said filter, the walls of which passages are composed of such mesh members, said passages changing direction, whereby the medium may flow through the mesh of said members near the entrance of the panel when the filter is clean and partially through said passages and thence through the mesh of the members located progressively towards the exit of the panel as the panel becomes progressively loaded with particles.

5. A filtering panel operating on the principle of

impingement of particles on collecting surfaces, which includes a plurality of sheets of crimped mesh screening members positioned with the sheets extending in the general direction of the intended flow through the panel of the medium to be filtered, the crimp of said sheets being constructed and arranged to effect a multiple subdivision of the panel in both dimensions perpendicular to the general direction of flow of the medium to be filtered, thereby forming passages the walls of which are composed of such mesh members, which passages extend through said panel and a portion of each of said passages being disposed angularly with respect to a remaining portion of the passages.

7. An air filtering panel operating on the principle of impingement of particles on a collecting surface, which panel includes mesh screening members constructed and arranged to form passages extending through the panel of relatively large size as compared with the openings in said mesh members, said passages subdividing the panel in both dimensions perpendicular to the general direction of flow of the medium to be filtered and being so constructed and arranged that as the mesh members becomes progressively clogged the medium to be filtered may flow through such passages and encounter unclogged openings in said mesh members, said passages changing in direction. [119]

8. An air filtering panel operating on the principle of impingement of particles on a collecting surface, which panel includes mesh screening mem-

bers constructed and arranged to form passages extending through the panel of relatively large size as compared with the openings in said mesh members, said passages subdividing the panel in both dimensions perpendicular to the general direction of flow of the medium to be filtered and being so constructed and arranged that as the mesh of the members becomes progressively clogged the medium to be filtered may flow through such passages and encounter unclogged openings in said mesh members, said passages changing abruptly in direction."

and from in any way infringing upon said Letters Patent or upon the rights of the plaintiff under said Letters Patent.

(5) That plaintiff recover from defendants general damages which shall be due compensation for making, using and selling the invention not less than a reasonable royalty therefor, together with such costs and interest as may be fixed by the Court.

(6) That this cause be referred to Howard V. Calverley, Esq., as a Special Master, to take and report to the Court an account of the said compensation due plaintiff in this cause.

(7) That plaintiff recover its costs from the defendants in the amount of \$. . . . . to be taxed.

(8) That the accounting and reference for accounting as provided for in Paragraphs (5) and (6) hereof, be stayed pending appeal by defendants of this judgment or for the statutory period of time within which such appeal may be taken and if taken,



until the determination of this cause by the Appellate Court or the dismissal of the said appeal.

/s/ PEIRSON M. HALL,

United States District Judge.

Dated: February 26, 1952.

Approved as to form as provided in Rule 8.

LYON & LYON,

/s/ RICHARD F. LYON,

Attorneys for Plaintiff.

[Endorsed]: Filed February 26, 1952. [121]

[Title of District Court and Cause]

### NOTICE OF APPEAL

Notice is hereby given that Jules D. Gratiot and Air-Maze Corporation, defendants above named, appeal to the United States Court of Appeals for the Ninth Circuit from the Judgment entered in this action on the 27th day of February, 1952.

Dated: At Los Angeles, California, this 4th day of March, 1952.

OVERTON, LYMAN, PRINCE &  
VERMILLE

HYDE, MEYER, BALDWIN &  
DORAN, GEORGE S. BALDWIN

HARRIS, KIECH, FOSTER &  
HARRIS

FORD HARRIS, JR.,  
DONALD C. RUSSELL

/s/ By [Illegible]

Attorneys for Defendants. [128]

[Endorsed]: Filed March 4, 1952.

[Title of District Court and Cause.]

ORDER STAYING INJUNCTION  
AND FIXING BOND

This day this cause having come on to be heard upon the motion of defendants, Jules D. Gratiot and Air-Maze Corporation, for stay of injunction pending appeal, and for good cause shown, it is hereby ordered as follows:

It Is Hereby Ordered and Decreed, pursuant to Rule 62, Federal Rules of Civil Procedure, that the injunction ordered to be issued by the Judgment of this Court entered on February 27, 1952, and the issuance and service thereof, be and it is hereby suspended and stayed, pending the determination of the appeal, notice of which was filed in this Court on March 4, 1952, or until further order of this Court, upon condition that the defendants file with the Clerk of this Court on or before March 31, 1952, [123] a good and sufficient bond in the sum of Ten Thousand Dollars (\$10,000.00). The condition of this bond shall be that if Jules D. Gratiot and Air-Maze Corporation shall prosecute their said appeal to effect, or if they fail to make good their said appeal, shall answer all costs adjudged against them by reason thereof and shall pay plaintiff all damages which may be adjudged against defendants, Jules D. Gratiot and Air-Maze Corporation, or either of them, from and after the entry of the Judgment on February 27, 1952, until the final decision of the United States Court of Appeals for the Ninth Circuit, then this obligation shall be void; otherwise, the same

shall be and remain in full force and effect; provided, however, that this bond shall not be considered as securing the payment for any damages which may be adjudged against the defendants, Jules D. Gratiot and Air-Maze Corporation, or either of them, by reason of any manufacture, use or sale of the enjoined devices prior to the making and entry of said Judgment on February 27, 1952. No separate bond on appeal need be filed under Rule 73(c) of the Rules of Civil Procedure.

Dated: This seventeenth day of March, 1952.

/s/ LEON R. YANKWICH,  
United States District Judge.

Presented by:

HARRIS, KIECH, FOSTER & HARRIS,  
/s/ By FORD HARRIS, JR.,  
Attorneys for Defendants.

Approved as to form:

/s/ LYON & LYON,  
/s/ CHARLES G. LYON,  
Attorneys for Plaintiff.

[Endorsed]: Filed March 17, 1952. [124]



[Title of District Court and Cause]

## BOND ON STAY OF INJUNCTION

Know All Men by These Presents:

That The Travelers Indemnity Company, a Connecticut corporation and duly authorized to do business in the State of California and within the District of the Federal Court above entitled, is held and firmly bound unto Farr Company, a California corporation, plaintiff in the above entitled action, in the sum of Ten Thousand Dollars (\$10,000.00) to be paid to the said plaintiff and for the payment of which well and truly to be made we bind ourselves and our successors in interest firmly by these presents.

Dated this 25th day of March, 1952. [125]

Whereas, the above named Jules D. Gratiot and Air-Maze Corporation, defendants in the above entitled action, have filed a notice of appeal to the United States Court of Appeals for the Ninth Circuit, in the District Court for the Southern District of California, Central Division, from the entire judgment entered in said action on the 27th day of February, 1952.

Now, therefore, the condition of this obligation is such that if the above-named defendants, Jules D. Gratiot and Air-Maze Corporation, shall prosecute their said appeal to effect, or if they fail to make good their said appeal, shall answer all costs adjudged against them by reason thereof and shall pay plaintiff all damages which may be adjudged

against defendants, Jules D. Gratiot and Air-Maze Corporation, or either of them, from and after the entry of the judgment on February 27, 1952, until the final decision of the United States Court of Appeals for the Ninth Circuit, then this obligation shall be void; otherwise, the same shall be and remain in full force and effect; provided, however, that this bond shall not be considered as securing the payment for any damages which may be adjudged against the defendants, Jules D. Gratiot and Air-Maze Corporation, or either of them, by reason of any manufacture, use or sale of the enjoined devices prior to the making and entry of said judgment on February 27, 1952.

[Seal] THE TRAVELERS INDEMNITY CO.  
/s/ By JOHN F. DICKEY,  
Attorney in Fact.

Countersigned by:

[Seal] /s/ F. S. PLEWS,  
California Resident Agent

Premium charge for this bond is \$200.00.

State of California,  
County of Los Angeles, ss:

On this 25th day of March, in the year 1952, before me, Marguerite Stevens, a Notary Public in and for [126] said County, residing therein, duly commissioned and sworn, personally appeared John F. Dickey, known to me to be the Attorney in Fact of The Travelers Indemnity Company, the corporation described in and that executed the within in-

strument, and also known to me to be the person who executed it on behalf of the corporation therein named, and he acknowledged to me that such corporation executed the same.

In Witness Whereof, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.

[Seal]            /s/ MARGUERITE STEVENS  
Notary Public in and for the County of Los Angeles, State of California. My Commission expires June 2, 1955.

Examined and recommended for approval as provided in Rule 8.

/s/ FORD HARRIS, JR.  
Attorney for Defendants.

Approved as to form.

/s/ RICHARD F. LYON,  
Attorney for Plaintiff.

I hereby approve the foregoing.

Dated this 28th day of March, 1952.

/s/ WM. C. MATHES,  
United States District Judge.

[Endorsed]: Filed March 28, 1952. [127]

[Title of District Court and Cause.]

### CERTIFICATE OF CLERK

I, Edmund L. Smith, Clerk of the United States District Court for the Southern District of California, do hereby certify that the foregoing pages numbered from 1 to 151, inclusive, contain the original Complaint for Infringement of Letters Patent 2,286,479; Summons and Returns of Service; Notice of Motion Under Rule 12(b) of Defendant Air-Maze Corporation to Dismiss the Action, to Quash the Return of Service of Summons for Want of Jurisdiction and Improper Venue; Jurisdictional Affidavit-Corporation Not Doing Business in Jurisdiction; Affidavit of Jules D. Gratiot in Support of Motion to Quash Service of Summons on Air-Maze Corporation and in Support of Motion to Dismiss as to Air-Maze Corporation; Answer of Defendant Jules D. Gratiot to Complaint; Memorandum and Order; Answer of Defendant Air-Maze Corporation to Complaint; Memorandum of Defendant Air-Maze Corporation in Support of Motion to Dismiss the Action and to Quash the Return of Service of Summons for Improper Venue; Stipulation and Order re Amended Answer; First Amended Answer of Defendants Jules D. Gratiot and Air-Maze Corporation; Findings of Fact and Conclusions of Law; Judgment; Order Staying Injunction and Fixing Bond; Bond on Stay of Injunction; Notice of Appeal; Appellants' Statement of Points on Appeal; Appellants' Designation of Record on Appeal; Counter-Designation of Contents of Record



on Appeal and Stipulation and Order Extending Time to Docket Appeal which, together with the original exhibits and copy of Reporter's Transcript of Proceedings on November 28, 29 and 30, December 4, 5, 6, 7, 11, 12 and 19, 1951, January 3 and 4, 1952, transmitted herewith, constitute the record on appeal to the United States Court of Appeals for the Ninth Circuit.

I further certify that my fees for preparing and certifying the foregoing record amount to \$2.80 which sum has been paid to me by appellants.

Witness my hand and the seal of said District Court this 21st day of April, A.D. 1952.

[Seal]                      EDMUND L. SMITH,  
                                    Clerk

s/ By THEODORE HOCKE,  
            Chief Deputy

In the United States District Court, Southern  
District of California, Central Division

Civil—No. 9759—PH

FARR COMPANY, a corporation,  
Plaintiff,  
vs.

JULES D. GRATIOT and AIR-MAZE  
CORPORATION,  
Defendants.

REPORTER'S TRANSCRIPT OF  
PROCEEDINGS

Los Angeles, California, November 28, 1951  
Honorable Peirson M. Hall, Judge Presiding.

Appearances: For the Plaintiff: Lyon & Lyon,  
811 West Seventh St., Los Angeles 14, Calif., by  
Leonard S. Lyon, Esq., and Richard F. Lyon, Esq.,  
and Richard E. Lyon, Esq. [1\*] For the Defend-  
ants: Hyde, Meyer, Baldwin & Doran, 1430 Kieth  
Bldg., Cleveland 15, Ohio, by George S. Baldwin,  
Esq., and Harris, Kiech, Foster & Harris, 417 So.  
Hill St., Los Angeles 13, California, by Ford Harris,  
Jr., Esq.

Los Angeles, California; November 28, 1951,  
3:00 o'clock p.m.

The Court: Farr Company vs. Gratiot.

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\* Page numbering appearing at bottom of page of original Re-  
porter's Transcript of Record.

Mr. Leonard S. Lyon: Yes, your Honor.

\* \* \* \* \* [5]

The Court: I suppose non-certified copies, it is stipulated, may be used?

Mr. Leonard S. Lyon: We have agreed that uncertified copies may be used.

Mr. Harris: That was the informal understanding. We have had no pretrial hearing in the case but my understanding is that uncertified, soft copies of patents and photostatic copies of foreign patents may be used with the same force and effect as certified copies certified by the United States Patent Office.

Mr. Leonard S. Lyon: That applies to both the patent in suit and the prior art.

Mr. Harris: Yes.

The Court: Very well. So stipulated?

Mr. Harris: So stipulated.

Mr. Leonard S. Lyon: So stipulated.

The Court: So ordered.

Mr. Leonard S. Lyon: The filters that we are concerned with in this case, your Honor, are designed and used to remove dust from air. [6]

\* \* \* \* \*

There is one fundamental characteristic of the filters that we are interested in, and that is as stated in the first paragraph of the patent: they are to operate on the impingement principle.

The Court: It says, "by the swirling, baffling, impingement principle."

Mr. Leonard S. Lyon: Yes. The swirling and baffling are two of the things that I am going to

take out of the impingement principle, now, when I explain that.

The Court: All right.

Mr. Leonard S. Lyon: There is another type of filter. I will explain the other type by contrast. The other type of filter is one where you force the air or liquid through holes and those holes are supposed to be smaller than the particles that the filter is going to entrap, and therefore the particles cannot get through the filter and they are separated from the air or the liquid. That is not the impingement principle. That is the other filter principle. [8]

The impingement principle is where you have surfaces that are oiled and where the air comes in contact with those surfaces and the particles adhere to the surfaces. They are not held from moving forward by being bigger than the hole. They just stick.

The Court: The air is brought forcibly into contact with the oiled surface?

Mr. Leonard S. Lyon: Not violently, but by a current of air, by a current of air passing over and in contact, and in contact with the oiled surfaces, the particles collect on the oiled surface and do not follow through with the air. [9]

\* \* \* \* \*

Mr. Leonard S. Lyon: Exhibit No. 1.

The Court: That is the patent in suit.

Mr. Leonard S. Lyon: And the panel I have just exhibited to your Honor as Exhibit No. 2.

(A copy of Patent No. 2,286,479, issued to Morrill N. Farr, June 16, 1942, was marked Plaintiff's Exhibit No. 1 for identification.)

The Court: Exhibit No. 2 is an exemplification of the patent in suit?

Mr. Leonard S. Lyon: That is correct.

(Said panel was marked Plaintiff's Exhibit No. 2 for identification.)

The Court: And is made to the size of what?

Mr. Leonard S. Lyon: The regular commercial size.

The Court: The regular commercial size.

Mr. Leonard S. Lyon: Now, your Honor will see, in the first place, that we start in describing this filter with the fact that it is made out of sheets of——

The Court: Well, you have another thing in your hand. We will call that No. 3 for identification.

Mr. Leonard S. Lyon: I will describe Exhibit No. 3 as being a specimen of the media employed in the commercial patented filter and in Exhibit 2——

This is Exhibit No. 3, now, the last specimen.

The Court: Yes.

(Said specimen was marked Plaintiff's Exhibit No. 3 for identification.) [10]

The Court: The patent is Exhibit No. 1, the big square panel is No. 2, and the little one is No. 3.

The Clerk: Exhibit No. 3.

Mr. Leonard S. Lyon: Now, this patented filter is made of sheets of crimped wire mesh. The holes in this mesh are much larger than any particle that you expect to receive.

The Court: What is the size of the hole?



Mr. Leonard S. Lyon: I think the size is about one-sixteenth.

Mr. S. F. Duncan: 14 mesh.

Mr. Leonard S. Lyon: 14 mesh.

The Court: 14 mesh. 14 to a square inch.

Mr. Leonard S. Lyon: That is right. These sheets are crimped and they have a herringbone structure, that is——

The Court: Crimping?

Mr. Leonard S. Lyon: That is, the crimping forms the sheets into small triangles, a series of small triangles. In the herringbone structure, there is an angle which is added, which changes the direction of the passage.

Now, we start out with the fundamental feature of this construction, that these sheets are arranged, not across the face of the panel, but are arranged parallel to the flow of air through the filter, so that together——

The Court: The air flows across the surfaces rather than through them? [11]

Mr. Leonard S. Lyon: They form a series of channels or passageways, and the air flows down those passageways. [12]

\* \* \* \* \*

The three features of the new patented construction which I want to emphasize, and which are emphasized in the patent in suit, which we will discuss in the evidence, are the fact that we have sheets of crimped wire mesh arranged parallel to the flow of the filter, the formation of the multiple subdivision in the filter in both dimensions, per-

pendicular to the flow through the filter, and then the change in direction in the passageways.

\* \* \* \* \*

Mr. Leonard S. Lyon: We were asked by the defendants to specify the claims in suit by a motion to make more definite.

The court: Which ones were they?

Mr. Leonard S. Lyon: And they filed a catalog of the [15] defendants, and we specified and charged their so-called Air-Maze Type P-5 Air Filter panel with infringement, and we specified that Claims 4, 5, 7 and 8 are charged to be infringed. [16]

Now there has been a prior litigation between the parties in this suit, your Honor. At the time the plaintiff brought out this new patented filter back about 1940 the defendant, the Air-Maze Company of Ohio, was in the business in a very large way. It was making the old-style filter on which it had a patent, and I have a specimen of the old-style Air-Maze filter here, which I will ask to be marked Exhibit No. 5 for identification.

The Court: That is Air-Maze manufacture——

Mr. Leonard S. Lyon: Old style.

The Court: ——old style?

Mr. Leonard S. Lyon: Yes, your Honor.

(The article referred to was marked Plaintiff's Exhibit No. 5 for identification.)

The Court: "Old style," meaning how old?

Mr. Leonard S. Lyon: It has been manufactured for some considerable number of years.

The Court: It was manufactured up to 1940?

Mr. Leonard S. Lyon: Yes. [17]

The Court: Is that your position?

Mr. Leonard S. Lyon: Yes.

Mr. Baldwin: It is still being manufactured, your Honor.

The Court: I see.

Mr. Leonard S. Lyon: Now in this filter the sheets of wire are across the face of the filter and are arranged at right angles to what they are in the patented filter.

The Court: That is to say, they are arranged so that the air flows through the screen rather than along the surface of it?

Mr. Leonard S. Lyon: That is correct.

And the Air-Maze Corporation had a patent on that filter, and they accused the plaintiff in this case, who had just brought out their patented filter that is involved in this case, of infringing that patent.

Judge Yankwich held for the plaintiff in this case against the Air-Maze Corporation, holding there was no infringement, basing his opinion on the fact that there was a marked difference between these filters in that the Air-Maze filter, the old style, did not have the sheets arranged to form passageways, did not have the shades arranged parallel to the flow of the air through the filter, and he dismissed the case.

Whereupon shortly after that the Air-Maze Corporation brought out this copy of the patented filter. Now this case [18] represents a very striking example of the function of the patent system in this country.

The plaintiff corporation, the Farr Corporation, when it was organized under an earlier name, had a capital of \$150. It started in business here in Los Angeles, first with the humidifier, manufactured the humidifier for a couple of years, and then brought out this filter, and this filter was brand new as far as the efficiency and the performance of the filter is concerned. It established a new standard in the industry. It had a performance that there had never been anything equal to it or approaching it.

The filter was commercialized, it was accepted throughout the industry. Each year the sales have grown. Since 1940 there have been \$7,500,000 worth of these filters sold by the plaintiff corporation, and it represents the founding of a new business based on the protection of a patent.

Like every other patent, I suppose the time comes when your competitors can't resist copying you and come in and contest your patent and try to take the business away from you.

But this is a case of a deliberate copying of an established brand new filter which was recognized in the industry as new and which had been a great success, and instead of continuing with their old device on which they had based the suit against these people, having lost that suit, they turn [19] over and copied the filter.

Now I have a specimen here of the Air-Maze accused filter medium. I will ask that it be marked Exhibit 6.

(The specimen referred to was marked Plaintiff's Exhibit No. 6 for identification.)



Mr. Leonard S. Lyon: You will see that it has sheets of wire mesh, crimped sheets of wire mesh, that those crimped sheets form multiple subdivisions in both dimensions, at right angles to the flow of the air through the filter, and you will see that it has the changes in directions formed by the angulation of the channels, and you will see that it does not have the flat strips and is therefore not as rigid a filter as the plaintiff's.

But we will show that this Air-Maze filter—by our evidence I expect to show—has the characteristic novelty and unique performance characteristics of the patented filter which we say no one had ever equalled in the prior art and, as far as I can see, Claims 4, 5, 7 and 8 of the patent read just as well on this medium as they do on the media used by the plaintiff.

The Court: Is it claimed to be a part of the patent that you use oil?

Mr. Leonard S. Lyon: The patent states that you dip these filters in oil.

The Court: I mean, is that part of the invention or [20] is that old?

Mr. Leonard S. Lyon: No, all these impingement filters had to be dipped in oil, and had been for some time.

Now there is one matter that we would seem to be in disagreement about. As I say, that catalog of the P-5 accused filter was served on us by the defendants in connection with this demand, and in the statement accompanying the catalog is this:

“Said catalog is filed herewith as Exhibit B to



the motion of the defendants to quash and modify subpoena and to limit the depositions under Rules 26, 30-B and 45-B in order to simplify the issues herein, save the time of court and counsel, and to facilitate preparation by plaintiff of the statement as provided under Item 6-A and 7-A referred to in said motion, as to which of said devices plaintiff claims infringed the patent in suit. Defendants also submit the within catalog in support of their motion for a more definite statement under Rule 12-E now pending herein and also to facilitate preparation by plaintiff of a more definite statement under Items 2 and 4 of the motion if said motion is granted."

In the statements accompanying this catalog made at the hearing and in the briefs, counsel stated that this catalog [21] showed all of the devices, the only devices, that the defendant was manufacturing. I will refer to those statements in detail if the occasion becomes necessary.

Now on Monday of this week, although the case has been at issue in this court many times, we received a letter from Mr. Harris in which he, with three other specimens, wants to have those types adjudicated in this case.

\* \* \* \* \*

There is a fourth type referred to, and that is an abandoned type, that they had abandoned, and told us they abandoned and no longer carried in their catalog.

We certainly are not interested in litigating their abandoned types. So I think that may be something

that we should have definitely settled at the beginning of the trial. [22]

\* \* \* \* \*

The Court: Is there a cross-claim for declaratory relief here?

Mr. Harris: Yes, your honor, there is.

The Court: Does it include these specimens?

Mr. Harris: None of the pleadings say anything about the types of filters, accused or charged to infringe.

The Court: In your cross-claim do you—well, let us see it. (Examining document.)

Mr. Harris: It is simply a prayer for declaratory judgment at the end of the answer.

The Court: That is the first amended answer?

Mr. Harris: I think that would be the second one, your Honor. That is on top of the file.

The Court: You only filed one first amended answer? [23]

Mr. Harris: On September 17th, first amended answer; yes, your Honor.

The Court: You just include that in your prayer?

Mr. Harris: That is correct, your Honor.

The situation on that, if I may state, your Honor, is this: The plaintiff here, in answer to our inquiry, stated that they would rely upon the Type P-5 Air-Maze filter as an infringement of the patent in suit.

I find now last week, the end of last week, that the defendant Air-Maze Corporation has for many

years prior to the manufacture of the present P-5 filter charged to infringe, made an earlier type of P-5 filter, which was so known to the art and sold as such. Now I want to know which P-5 the plaintiffs here are going to charge as the infringement of the patent in suit.

I have one of the old obsolete P-5s here. I displayed one to counsel Monday, and I am sure the representatives of the plaintiff corporation are familiar with that filter for many years because the Air-Maze Corporation has sold 8000 or 10,000 of them in a period of four or five years.

So I want to know whether that is in suit or not, because it has been sold within six years of the filing of this suit. There might be a claim for damages against that obsolete type P-5.

The Court: Does it correspond with the P-5 described in [24] your catalog?

Mr. Harris: No, sir, it does not. It is a different construction.

The Court: It is a different P-5?

Mr. Harris: It is a different P-5; yes, sir.

The Court: What is your position on that?

Mr. Leonard S. Lyon: We are not charging it with infringement in this case. We have understood it is abandoned and we are not bringing it into the case at all.

Now, as I understand it, it hasn't been sold for many years and it has been abandoned and replaced by the device that we do accuse.

The Court: Which is the P-5 as illustrated in the catalog which does not appear to have any date? Does this catalog have any date?

Mr. Harris: I don't know, but the sales of those started about 1948.

The Court: It says P-5-1047, which is the only key or description that I can find on this.

Mr. Harris: The sales of those started about 1947 to '48, your Honor, I have been advised.

May I have this sample P-5, obsolete filter, marked for identification so that the record will show what we are talking about here?

The Court: Defendants' Exhibit A. [25]

\* \* \* \* \*

The Court: You do not mention any P-5 in your original complaint.

Mr. Leonard S. Lyon: We did in the motion to make more definite and certain, and we referred to the catalog, your Honor, which you have in front of you. [27]

\* \* \* \* \*

Mr. Harris: Your Honor, just so the record is clear, my understanding from this colloquy is that the plaintiff in this case does not contend that the P-5 obsolete, Defendants' Exhibit A for identification, is an infringement of the Farr patent in suit.

Mr. Leonard S. Lyon: I make no contention one way or the other about that. That is an abandoned device. It has long since disappeared. It hasn't been around for years and years [30] and is not being made now.

The Court: Maybe they will start making them again.

Mr. Leonard S. Lyon: If they do, then we will talk to them about it. But it is not in issue in this case. [31]

\* \* \* \* \*

The Court: It would seem to me that the plaintiffs should now make up their minds as to whether or not you are either going to claim damages for the past sales or waive it as to that particular device.

Mr. Leonard S. Lyon: We do do that.

The Court: And whether or not you are going to claim an injunction in the event the patent is held good as to that particular device.

Mr. Leonard S. Lyon: That I agree with your Honor on. We have no intention of pressing any claim for these abandoned sales, no intention of asking the court in this case to grant any injunction against this abandoned device. [32]

\* \* \* \* \*

Mr. Harris: Just for the purpose of the record, I would like to identify the contents of Exhibit B for identification:

Tab No. 1 is Patent No. 1,118,237, to St. Cyr.

Tab No. 2 is Patent No. 1,548,839, to Henshall.

Tab No. 3 is Patent No. 1,566,088, to Greene.

Tab No. 4 is Patent No. 1,576,121, to Preble.

Tab No. 5 is Patent No. 1,729,135, to Slauson.

Tab No. 6 is Patent No. 1,756,758, to Orem.

Tab No. 7 is Patent No. 1,841,250, to Merryweather.

Tab No. 8 is Patent No. 2,019,186, to Kaiser.



Tab No. 9 is Patent No. 2,079,297, to Manning.

Tab No. 10 is Patent No. 2,286,480, to Farr.

Tab No. 11 is Patent No. 2,252,242, to Wood.

All of those patents are United States letters patent.

Next, Tab No. 12 is British Patent No. 24,467, to Kirkham, issued in 1904.

Next, as Tab No. 13, is British Patent No. 13,222, to Row, also issued in 1904. [35]

Tab No. 14 is British Patent No. 211,756, to Moller, issued in 1923.

And Tab No. 15 is a French patent, No. 739,956, to Niestle, issued in 1932. [36]

\* \* \* \* \*

Los Angeles, California

November 29, 1951; 10:00 o'clock a.m.

The Court: All right, you may proceed.

Mr. Harris: If the Court please, as a footnote to yesterday's opening statements, I think, in fairness to the plaintiff and the plaintiff's counsel, we should state at this time that the defendants will rely upon a further defense, and that is this:

The patent in suit bears the application date of April 4, 1940. Actually, when this application was filed, on April 4, 1940, the application was not signed by the applicant, the specifications and claims were not signed by the applicant as required by statute, and it was not until February 6, 1942, that Morrill N. Farr filed with the Patent Office a signed specification and claims as required by statute, and we shall contend that, by that time, February 6,

1942, that was the effective date of the application, the filing date, and that by that time the construction illustrated and described in the patent in suit had been in public use for the two years.

The Court: Very well. I think that defense is set up in your answer, isn't it?

Mr. Harris: It is, your Honor.

Mr. Leonard S. Lyon: The application inadvertently was not signed and we take the position that was a mere formality which the Patent Office could be allowed to be [58] corrected and which they did allow to be corrected, and the application is effective as of the date of the original filing.

I have two formal matters before I start with the evidence, your Honor.

The plaintiff alleges that the plaintiff, Farr Company, is a corporation organized and existing under the laws of the State of California. The defendants deny that allegation for lack of information. I don't understand that that raises an issue, but to avoid any question I will ask if the defendants will concede that that allegation is correct and that the plaintiff is a corporation organized and existing under the laws of the State of California.

Mr. Harris: We make no issue on that, your Honor.

The Court: Well, do you stipulate?

Mr. Harris: Yes, we do so stipulate. [59]

Mr. Leonard S. Lyon: The defendant Air-Maze Corporation is a foreign corporation and has been served in this district and venue against that corporation is asserted by plaintiff in this case on the

basis that the defendant Air-Maze Corporation is doing business in this district.

At the time of the hearing on the motion to quash and the issue as to venue, the defendant stipulated before your Honor that it was doing business in the Southern District of California. In your Honor's opinion—I am reading from it on the venue question—you stated:

“The defendant Air-Maze Corporation is a Delaware corporation. It has filed a motion to dismiss and to quash service of summons for want of jurisdiction and improper venue. While there is some dispute as to the extent of the agency and activity of the defendant Gratiot, who held himself out as factory representative of the defendant corporation, it is conceded by the corporate defendant that his activities were more than that of a mere solicitor of sales and, in fact, that the corporation was doing business within this district in the jurisdictional sense.”

That concession appears on page 3, lines 9 to 22 of the memorandum of defendant Air-Maze Corporation in support of the motion to dismiss the action and to quash the return of [60] service of summons for improper venue.

Now my point is, in view of the statements that were made in the opening statement by counsel for the defendant yesterday and in view of the pleadings in this case in the answer which was served subsequent to this hearing on the motion to quash, does that stipulation stand or is it necessary that we go into the proofs that were taken on this matter and which are in the form of depositions?

In other words, the concession was made and recited in your Honor's opinion. I don't want any misunderstanding of failure of proof on this point, but I don't want to burden the court with a long consideration of depositions on a matter that is, in fact, conceded and stands conceded.

Mr. Harris: Your Honor please, I think my recollection is that Overton, Lyman & Plumb handled the representation for the defendant on that motion to quash and dismiss for Air-Maze Corporation.

I do not know what understandings were had at that time. Any stipulations which were made of course we will abide by, but I might say this at this time, that we are not going to waive our defense that was raised by that motion that this court does not have jurisdiction and that the venue is improper.

The Court: As I understood the question at the time I decided it previously, it was conceded that Air-Maze was [61] doing business in this district and the question narrowed down to the proposition as to whether or not the provision in Section 1400(b) of Title 28, having in the conjunctive the requirement that it must commit acts of infringement and have a regular and established place of business. It was not conceded that they had a regular and established place of business in this district, but it was conceded that they were doing business.

So the point is still preserved that you raised then, unless you wish to put proof on to bring them within the conjunctive provisions of that section. But that is up to the plaintiff.



Mr. Leonard S. Lyon: I am not interested at this time in any point except whether or not it stands conceded.

The Court: That they were doing business?

Mr. Leonard S. Lyon: That they were doing business in this district.

The Court: Well, the concession was made then. I suppose they are standing by the concession and the stipulation made at that time.

Mr. Harris: I have just stated that. Anything that was conceded then we concede now. Whether it was conceded then, I do not know.

The Court: It was conceded. Now you know.

Is it your intention, Mr. Lyon, to put any evidence on [62] under that provision of the code which states that there is jurisdiction where it has committed acts of infringement and has a regular and established place of business?

Mr. Leonard S. Lyon: No.

The Court: You do not propose to offer any proof that they have a regular and established place of business?

Mr. Leonard S. Lyon: We are going to stand on the proposition that that is sufficient to establish venue.

The Court: And that they have committed acts of infringement, however, in this district?

Mr. Leonard S. Lyon: Yes, they have, but in the sense that through Mr. Gratiot the accused filter panels have been sold in this district.

The Court: Very well.

Mr. Leonard S. Lyon: At this time, your Honor,



we will offer in evidence the patent in suit which has heretofore been marked Exhibit 1 and ask that it be received as Exhibit 1.

The Court: It is in evidence.

(The document referred to was received in evidence and marked Plaintiff's Exhibit No. 1.)

[Printer's Note: Plaintiff's Exhibit 1 is reproduced in Book of Exhibits.]

Mr. Leonard S. Lyon: At this time I am offering in evidence the certified copy of the file wrapper and contents of the patent in suit, which has heretofore been marked Exhibit B on defendants' motion for summary judgment, and ask that [63] it be received in evidence as Plaintiff's Exhibit 7.

Mr. Harris: No objection.

The Court: I think it would be preferable to make it Exhibit 1-A, the patent and the file wrapper.

Mr. Leonard S. Lyon: All right.

(The document referred to was received in evidence and marked Plaintiff's Exhibit No. 1-A.)

[Printer's Note: Plaintiff's Exhibit 1A is reproduced in Book of Exhibits.]

Mr. Leonard S. Lyon: As has been explained to your Honor, the application which is incorporated in Exhibit 1-A, which was just offered in evidence, was filed as a substitute for an earlier application, the earlier application then having been dropped.

At this time I offer in evidence a certified copy

of the file wrapper and contents in the matter of the earlier application, Serial No. 285,904.

This certified copy has been before the court and heretofore marked Exhibit B to defendants' motion for summary judgment. I will ask that it be received in evidence and marked——

The Court: Plaintiff's Exhibit 1-B.

Mr. Harris: No objection.

The Court: Admitted.

(The document referred to was received in evidence and marked Plaintiff's Exhibit No. 1-B.) [64]

[Printer's Note: Plaintiff's Exhibit 1B is reproduced in Book of Exhibits.

### SYDNEY F. DUNCAN

called as a witness on behalf of the plaintiff, being first duly sworn, was examined and testified as follows:

The Clerk: State your name in full, please.

The Witness: Sydney F. Duncan.

\* \* \* \* \*

### Direct Examination

By Mr. Leonard S. Lyon:

Q. You have stated your name. Will you please state your residence?

A. 3872 Welland Avenue, Los Angeles 8.

Q. How old are you?            A. 47.

Q. What is your occupation?

(Testimony of Sydney F. Duncan.)

A. I am professor of mechanical engineering and head of the mechanical engineering department of the University of [65] Southern California.

Q. How long have you been on the faculty with the University of Southern California?

A. I have been on the faculty there 22 years.

Q. What school training in engineering did you have before you went with the faculty of the University of Southern California?

A. I graduated from California Institute of Technology in 1924, with a Bachelor Science in mechanical engineering, and in 1925 with a Bachelor of Science in electrical engineering, and again in 1939 with a Master of Science in mechanical engineering, all from California Institute of Technology.

Q. Now, what if any experience have you had with dust filters?

A. Well, the experience with dust filters as such might be divided into two categories: (1) studies that I have pursued in the field of the mechanics of flow of gases and so on which are involved, and (2) through the observation and study of the action of dust filters of various kinds in the ordinary pursuit of my mechanical engineering activities.

Q. Have you had any employment by the plaintiff, Farr Company?

A. I have been acting as consultant to the Farr Corporation for some years, and at the present time I have a one-year's leave of absence from the university to work with them on problems of research and development.

(Testimony of Sydney F. Duncan.)

Q. How long have you acted as consultant for the Farr Company?

A. I do not remember exactly, but I have been associated with them in one way or another, either as a friend or as a consultant, ever since they started the business.

Q. Will you explain what you mean by acting as a consultant for them? What have you done as a consultant for the Farr Company?

A. Well, in working with the Farr Company, my principal activity as a consultant has been to assist in designing and discussing the operation, the operative characteristics of, and building and checking filter test apparatus.

I have also discussed with them and assisted in the design of machines for producing filters, and we have also consulted together on various possible arrangements of our filter media to achieve certain desired results.

Q. Did you testify as an expert witness for the Farr Company before Judge Yankwich in the suit involving Greene Patent No. 1,566,088, entitled "Air-Maze Corporation et al. v. Temperatair and Farr Company, Defendants," Civil Action No. 2519-Y?      A. Yes. [67]

Q. In Plaintiff's Exhibit 1-A, on page 47, is a document entitled "Affidavit of Sydney F. Duncan." Are you the Sydney F. Duncan who made that affidavit?      A. Yes.

Q. Have you reviewed this affidavit recently?

(Testimony of Sydney F. Duncan.)

A. Yes, sir, I have.

Q. Are each of the statements contained therein true and correct according to your present knowledge?

Mr. Harris: That is objected to, if the Court please. It calls for a conclusion of the witness and he should state the facts and not his conclusions as to these statements.

Mr. Leonard S. Lyon: I am trying to save time, your Honor. Here is an affidavit filed by the witness in the Patent Office, and I can read it to him and ask him to state if it is a correct statement.

Mr. Harris: The affidavit is some twenty-odd pages long, as I recollect.

The Court: What page?

Mr. Leonard S. Lyon: Page 47.

The Court: Well, it is a little unorthodox way to make proof. You object to it?

Mr. Harris: Yes.

The Court: You can't cross-examine the affidavit, but the witness is here and you can cross-examine him.

Mr. Harris: That is right, your Honor. [68]

The only point is that by testimony he cannot vary the terms of the affidavit. At the same time we have to take the affidavit and go through it, bit by bit, and pick out every point that we might think might be material to the issues in this case, which I think puts a hardship on the defendants. Certainly all the facts stated in this affidavit are not material to this case.



(Testimony of Sydney F. Duncan.)

Mr. Leonard S. Lyon: Well, I think they are. This was an affidavit presented in the Patent Office by the witness.

The Court: Well, this appears to be largely expert opinion.

Mr. Leonard S. Lyon: That is right, your Honor. I am going through the pertinent material with the exhibits, your Honor, but I thought that counsel would appreciate my laying the witness open to cross examination. They have criticized some of the proceedings in the Patent Office, and I have the witness here and they can cross-examine him on any of them in this affidavit.

Mr. Harris: We think many of the statements are objectionable, if the Court please, are conclusions of the witness and are subject to objection.

The Court: Well, for instance?

Mr. Harris: Here is one right at the front somewhere that is an all-sweeping conclusion, if I can find it quickly.

The Court: Well, he is qualified as an expert. He can [69] give his opinion.

Mr. Harris: Here it is, on page 47 of the file wrapper, where he says:

“The air filter panel in the above-entitled application possesses an entirely new and original mode of operation in removing dust from air.”

I think that is a very sweeping conclusion, for which there has been no foundation laid to date in the testimony in the case or according to the affidavit either.

(Testimony of Sydney F. Duncan.)

The Court: Yes, that is quite a sweeping conclusion but I suppose he would be entitled to express his opinion. That, however, is the thing which the court must decide. I think, with that exception, probably the rest of it—I haven't read it through, but it appears to be an exposition of the processes of air filtering involved.

Mr. Harris: Well, I think that we could pick out other statements.

The Court: What is that?

Mr. Harris: It seems to me, your Honor, that is a curious way to make evidence in a case, to take an affidavit a man has made and ask him if all the statements therein are true and correct.

The Court: Yes, it is a little unorthodox, I would say, but as long as it is an opinion—You are entitled to press your objection, I think. I don't see anything wrong with the [70] question. You can cross-examine him on it. With that one exception there, I will sustain your objection, insofar as that conclusion is concerned, that "The air filter panel in the above-entitled application possesses an entirely new and original mode of operation in removing dust from air."

Mr. Harris: I think, if the Court please, that there are other statements of similar import in the affidavit. I can't put my finger on them at this moment, but, on behalf of the defendants, we make similar objection to such other statements as are in there.

The Court: Yes.

(Testimony of Sydney F. Duncan.)

Mr. Leonard S. Lyon: At page 81 of Exhibit 1-A, under the title "Remarks," the following appears:

"The interview courteously accorded a representative of applicant's counsel and the affiants in this application by the Primary and Assistant Examiners is hereby acknowledged with appreciation. At this interview favorable consideration of claims of the character now presented was indicated."

Your Honor, this was the interview that was referred to in Mr. Baldwin's opening statement yesterday. [71]

By Mr. Leonard S. Lyon:

Q. Did you attend that interview?                      A. Yes.

Mr. Leonard S. Lyon: My brother reminds me that the witness has not yet stated his answer to my preceding question.

The Court: That is correct.

Mr. Leonard S. Lyon: I would like an answer to that.

The Court: Whether or not the statements contained in this affidavit are true.

The Witness: Yes, they are.

By Mr. Leonard S. Lyon:

Q. Where did this interview take place that I have just referred to?

A. It was in the Patent Office in Washington.

Q. Who was present at that interview?

A. Richard S. Farr and myself and I think a representative from a law firm, Bacon & Thomas, I believe, in Washington, and the patent examiner.

(Testimony of Sydney F. Duncan.)

Q. Now as indicated by the date on this document to which I have just referred, this interview occurred on or about October 28 or 29, 1941. Is that according to your recollection?

A. I don't remember exactly, but it is about then. [72]

\* \* \* \* \*

By Mr. Leonard S. Lyon:

Q. Are you familiar with the patent in suit?

A. Yes, I am.

Q. Are you familiar with the filter panels that have been manufactured and sold by the plaintiff Farr Company under that patent in suit?

A. Yes, I am.

Q. Have you had occasion to consult with reference to the technical aspects of those filters and their performance and are you wholly familiar with their design, their method [74] of operation and their performance characteristics?

A. Yes, I am.

Q. Have you had occasion to establish test apparatus and testing techniques for use with those filters?

A. As I have said before, I have consulted with Farr Company for a good many years on establishing of testing techniques and the design of test apparatus.

Q. I call your attention to Exhibit P-2 for identification. Can you recognize this——

The Court: P-2?

Mr. Leonard S. Lyon: Plaintiff's Exhibit 2.

(Testimony of Sydney F. Duncan.)

Q. Can you recognize this as a typical commercial size filter panel of the type manufactured and sold by the plaintiff?      A. Yes, I can.

Q. Farr Corporation under the patent in suit?

A. Yes, very easily.

Mr. Leonard S. Lyon: I ask that the specimen that the witness has just identified be received in evidence as Plaintiff's Exhibit No. 2, a specimen of the commercial Farr filter panel as manufactured and sold under the patent in suit by the plaintiff corporation.

Mr. Harris: No objection.

The Court: Admitted. [75]

(The specimen referred to was received in evidence and marked Plaintiff's Exhibit No. 2.)

By Mr. Leonard S. Lyon:

Q. I show you Plaintiff's Exhibit 3 for identification. Do you recognize this as a true specimen of the filter material utilized by the plaintiff corporation in filters of the type represented by Exhibit 2?

A. Yes, it is a very good example of that type of medium.

Mr. Leonard S. Lyon: The exhibit just identified by the witness is offered in evidence as Plaintiff's Exhibit No. 3.

The Court: Admitted.

(The document referred to was received in evidence and marked Plaintiff's Exhibit No. 3.)



(Testimony of Sydney F. Duncan.)

By Mr. Leonard S. Lyon:

Q. I hand you a trade bulletin of the Farr Company entitled "Far-Air Filters," and ask you if you can tell us what that is.

A. This bulletin entitled "Far-Air Filters" is our newest bulletin describing the air filters made by Farr Company.

Q. Of the type illustrated by Exhibit 2?

A. Yes, of the type illustrated by Exhibit 2.

Q. Did you edit this bulletin before it was printed?      A. Yes, I did. [76]

Q. And approved each of the statements therein?

A. Yes, I went over the whole bulletin before it finally went to press.

Mr. Leonard S. Lyon: I will offer the bulletin in evidence.

The Court: What is the next number, 7?

The Clerk: 7.

Mr. Leonard S. Lyon: As Plaintiff's Exhibit 7, your Honor.

The Court: In evidence.

(The bulletin referred to was received in evidence and marked Plaintiff's Exhibit No. 7.)

By Mr. Leonard S. Lyon:

Q. Now will you take——

The Court: When was this published?

The Witness: I think we just got it last week.

By Mr. Leonard S. Lyon:

Q. It is a successor to a previous one?

(Testimony of Sydney F. Duncan.)

A. A successor or rewrite and improvement over a previous bulletin of somewhat similar nature.

Q. Will you now take a copy of the patent in suit and using that and with reference to Exhibits 2 and 3 explain to the court first the construction of the air filter described in that patent?

A. May I have Exhibit 3, please? [77]

(The exhibit referred to was passed to the witness.)

The Witness: Because I don't have a marked copy of the patent up here, I may have to look a moment for certain lines. But the patent specifications and the drawings describe a filtering panel made of sheets of crimped wire screen where the sheets are placed parallel to the direction of flow of the air to be filtered.

Now referring to Exhibit 3, a sheet of crimped wire screen would be this top layer which I have bent out.

The sheet of screen itself from which the crimped sheet was made takes a number of different directions in this crimped sheet, but the general plane of the crimped sheet lies parallel to the direction of flow of the air or gas or what ever medium is being passed through this filter.

In the manufacture of this filter and its assembly in the frame, which is shown more clearly surrounding the media on Plaintiff's Exhibit 2, this crimped screen is packed next to a layer of flat screen.

(Testimony of Sydney F. Duncan.)

This is a manufacturing convenience and enables the Farr Company to make these filters somewhat more rapidly and economically than the omission of the flat screen.

The patent specifications show in Fig. 2 a drawing of a construction which might be observed on Plaintiff's Exhibit 2 up in one of the corners where parts 3 are the frame, 5 is the aperture made by the crimps in the screen and 4 I believe [78] refers to the crimped screen wire itself.

The Court: 4?

The Witness: 4.

And 9 refers to the flat wire.

There are certain manufacturing advantages, as I have said, in using the flat wire and the crimped wire together, one of which is to make the filter panel somewhat more rugged and give it a little more area on which dust must collect.

The strips are run into a machine where they are crimped, they are fed in then by automatic apparatus into the frame which is a channel-like structure bent up in three sides of a rectangle usually, and as soon as the frame is packed full the fourth side of the rectangular channel section is closed with a suitable other sectional channel to strengthen the frame and hold the two open ends of the previously bent channel together, to keep the medium intact.

At this point the filter is placed in another machine and a rod drilled through it from top to bottom in a direction perpendicular to the general direc-

(Testimony of Sydney F. Duncan.)

tion of the sheets of crimped screen, the function of this rod being to further stiffen the filter media.

After assembly the filter is dipped in oil and the excess is either drained off or otherwise removed, the filter is wrapped in suitable paper and is ready for shipment to a user in its oiled condition, and then it is ready to be installed [79] in a bank of filters for taking the dust out of air.

Q. (By Mr. Leonard S. Lyon): Referring to Exhibit 7, is that——

The Court: Before you get to that, is there any significance in the depth of the crimps or height, or whatever you call them?

The Witness: In this particular sample of media, the crimps are made deep enough so that the filter has four layers to the inch very closely.

We also make them with—we can make them with three layers to the inch or with six layers to the inch or with varying numbers of layers to the inch.

The thing that determines the number of layers to the inch is the application of the filter. For instance, if the filter is being applied in a duct where there is a large amount of pressure available, then we could use more layers to the inch and decrease the height of the crimp, which would also decrease the width of the crimp.

The Court: And would give you more screen surface?

The Witness: And would give you more screen surface, and it would cause a higher pressure drop in the system.

(Testimony of Sydney F. Duncan.)

For a ventilating system such as supplies air to this room, it is desirable to have a fairly low pressure drop and so we have found that more layers to the inch give us a good average performance for many applications, although we do [80] make them with other numbers.

The Court: What do you mean, low pressure drop? You mean the pressure drops when the thing gets dirty?

The Witness: No—well, that is true, your Honor, but when we speak of pressure drop, this filter is installed in some kind of a system where air is delivered to one side of the filter and flows out the other side.

Because of the fact that the filter offers some resistance to that flow of air, there is a drop or decrease in pressure across the filter, whether it be clean or dirty. Anything that we interpose in such an air stream would cause a slight drop in pressure.

This drop in pressure is usually measured in inches of water by means of a U-tube filled with water, the low pressure being connected to one side of the U and the higher pressure to the other side of the U, and then the water will not stand at the same level in both sides of the U-tube, and we measure that difference in level and call it inches of water drop, sometimes referred to as inches of water.

By Mr. Leonard S. Lyon:

Q. What is the significance of that pressure drop? What does it present as a problem? Should



(Testimony of Sydney F. Duncan.)

it be avoided or what does it mean to a man interested in filtering air through these filters?

A. Well, to the man who is operating the ventilating [81] system, the pressure drop means that he has to supply electrical or mechanical energy to drive the air through, and the higher the pressure drop the more work it takes to maintain the flow through the filter.

Q. Is that a controlling factor in the use and sale of filters of this kind, what the pressure drop is?

A. It is a factor which is always taken into consideration.

Q. And in that sense it is an important factor?

A. It is an important factor; yes.

The Court: Do the greater number of layers per inch perform the function of cleaning the air more?

The Witness: Yes, it gives a somewhat higher filtering efficiency.

The Court: But requires a greater application of force to the air to get through?

The Witness: Also a somewhat higher pressure drop. [82]

By Mr. Leonard S. Lyon:

Q. What do you mean by filtering efficiency?

A. Well, the efficiency of a filter——

The Court: It makes the air cleaner, isn't that what you mean?

The Witness: Yes.

By Mr. Leonard S. Lyon:

Q. How do you measure it? How is it determined or expressed?

(Testimony of Sydney F. Duncan.)

A. We express the efficiency of a filter in per cent, and the per cent figure is arrived at in a test set.

The test set is essentially a duct with a dust-feeding apparatus at one end and an air-measuring device someplace toward the latter part of the duct, and a fan or blower to draw air through the duct.

In the duct that has been developed at the Farr Company, we sample the dust content of the air ahead of the test filter. Our duct, incidentally, is built to take a full commercial size filter, of this size, 20 by 20 inches.

We sample the dust concentration in the air approaching the filter and we sample the dust concentration in the air after the filter.

The difference in dust concentration has been removed by the filter, and the amount of dust removed by the filter, divided by the amount of dirt in the entering air, is [83] considered to be the efficiency.

Q. Now, is the efficiency over-all the only factor that governs the adaptability or value of these filters, or is it only one factor?

A. It is only one factor in the things to be considered in choosing a particular filter for a given application.

Q. How do you correlate, in choosing a filter, the efficiency of the filter as compared to the pressure drop?

A. Well, that depends on the application, principally. There are certain fundamental principles that we might state about the application of a filter.

(Testimony of Sydney F. Duncan.)

Since we know that the pressure drop causes us to do work to maintain the air flow through the filter, a low-pressure drop is usually considered desirable.

Since we have a device which is supposed to remove dust from the air, a high dust-removing efficiency is also desirable.

Since the filter will be operating over probably a considerable period of time, with perhaps frequent attention or infrequent attention, it is further desirable that the efficiency and pressure-drop characteristics of the filter remain reasonably constant with the passage of time.

So that we can probably best show the characteristics of filter operation by plotting a curve or showing, as it is [84] usually done, the efficiency of the filter versus the amount of dust that is held on the filter, and the pressure drop through the filter versus that same amount of dust held on the filter.

There are reproductions of such curves in the bulletin exhibit.

The Court: No. 7.

The Witness: No. 7, is it not?

Mr. Leonard S. Lyon: I have another copy here for you.

Q. I wish you would point to those curves in Exhibit 7 and explain to the court what they are, how they are made and what they show.

A. There seem to be no page numbers in this bulletin, through some strange oversight, but there is a page with a black tab at the left edge marked "Capacity Estimating Chart" and it is on this

(Testimony of Sydney F. Duncan.)

page that there appear reproductions of three characteristic curves.

One of these curves is labeled "Filter Performance With Composite Dusts." The vertical dimension of that curve has two scales.

At the top is an efficiency scale, starting at 100 at the top of the curve sheet and running down to 70 per cent just about the break in the curve sheet.

At the bottom is a scale of pressure loss and followed by the letters  $H_2O$ , indicating that that is the pressure loss [85] in inches of water, as I previously described.

Q. Is that pressure loss what is called the——

A. Pressure loss or pressure drop. The efficiency curve, then, for this filter starts at about 78 per cent and decreases slightly to about  $72\frac{1}{2}$  per cent when the filter has collected 800 grams of dust.

During the same test run, the pressure drop across this particular filter started at a little over one-tenth of an inch of water and rose to approximately one-eighth of an inch of water at the time that it held 800 grams of dust.

Q. Now, was the filter on which these measurements were made, recorded in this curve that you have just referred to, the same as Exhibit No. 2?

A. The filter tested is labeled "Far-Air 2 Type 44 Filter," and it is our usual production-run of filter. A sample was taken off the line and tested and gave these results.

When we used a particular dust mixture, incidentally, in the middle of this curve sheet there is

(Testimony of Sydney F. Duncan.)

printed the particular size, how much of the dust was used, and the chemical analysis of the dust used.

Q. And the filter on which these measurements were made and recorded on these curves was the filter made by the plaintiff corporation under the patent in suit, is that correct? [86]      A. Yes.

\* \* \* \* \*

Q. What do you know about the particular data recorded in this book?

A. The curves I have been just describing were run at my direction.

Q. And you examined the data?

A. Yes, I examined the procedure, the data, the results, and the final product, the curve sheet. [87]

\* \* \* \* \*

By Mr. Leonard S. Lyon:

Q. I note, Mr. Duncan, that the data and curves to which you are calling attention in Exhibit 7 are on a very small scale and I feel that it is putting something of a problem on the court to follow that small scale, so I have a remedy for that.

I hand you a booklet entitled "Technical Report on Improved Testing Methods for Air Filters," and ask you if you can tell us what that is.

A. This is a report that was prepared——

The Court: No. 8.

(The document referred to was marked Plaintiff's Exhibit No. 8 for identification.)



(Testimony of Sydney F. Duncan.)

The Court: Proceed.

The Witness: —by myself and others describing the test procedure and the test apparatus that is used at Farr Company.

By Mr. Leonard S. Lyon:

Q. And to which you have been referring?

A. It is on this apparatus and according to this procedure that the curves that I have been discussing on this page of the bulletin, Exhibit 7—the work was done on this apparatus and according to this procedure.

Q. And the same curves that you were referring to on Exhibit 7 appear in Exhibit 8, do they not? [88]

A. May I have a copy, please?

(The document referred to was passed to the witness.)

The Court: “Airflow, 519 FPM,” what does that mean?

The Witness: Feet per minute, lineal velocity, so that the lineal velocity applied by the net area of the filter would give the 1200 CFM, which is cubic feet per minute.

The curve I have described in the little bulletin is shown as graph 1 in the technical report, Exhibit 8.

The Court: “AC Spark Plug Standardized Fine Air Cleaner Test Dust,” what does that mean?

The Witness: That is a material that was developed during the last war to test air filters, and

(Testimony of Sydney F. Duncan.)

it is a natural earth material that is obtained in Arizona. It is screened and partially prepared there by the General Motors laboratory and then sent to the AC Spark Plug Division of the General Motors for subsequent classification and standardization so that it has a guaranteed particle size analysis, as shown on Graph No. 1 of Exhibit 8 under the heading "By Weight Dust Specifications" and the chemical analysis under the table on the same page "Dust Analysis, Chemical, Per Cent."

This dust is readily available and gives a uniform material to be used as a test dust.

It also contains a considerable percentage of fine material so that we get an overall picture of the performance characteristics and dust holding capacity of the filter by [89] using this.

The Court: These are the size of the microns and the percentage, I take it, from zero to five microns in size?

The Witness: Zero to five microns is the size of the dust particle that constitutes 39 per cent of this material by weight.

A micron is approximately 1/25,000 of an inch.

The Court: And 39 plus or minus 2 per cent, is that it?

The Witness: Yes.

The Court: That is to say, it might run down to 37 or it might run up to 41?

The Witness: Yes.

The Court: The dust analysis, chemical, these are the designated chemicals?

(Testimony of Sydney F. Duncan.)

The Witness: Yes.

The Court: Ignition loss, what is that?

The Witness: Ignition loss is that part of the material which is lost when it is heated and would represent perhaps carbonization material or perhaps a very small percentage of moisture.

The Court: Is the air heated for the test?

The Witness: No, the air is not heated for the test.

The Court: But it is heated by being forced at the speed?

The Witness: Not appreciably under the test conditions [90] of these filters.

By Mr. Leonard S. Lyon:

Q. By way of explanation, this dust analysis and chemical analysis for the test is an analysis that is made in the laboratory of the dust before the dust is brought to the test to be added to the air, isn't that correct?

A. Yes, this is the analysis that is guaranteed by the AC Spark Plug Division of General Motors Company and is made by them, not by us.

The Court: In other words, you take the dust and then you add it to the air, is that it?

The Witness: That is right.

By Mr. Leonard S. Lyon:

Q. For the purpose of making the test?

A. That is correct. But the air is not heated. The ignition loss is just a standard procedure in making chemical analyses.

The Court: What is "20 grams Fed."?

(Testimony of Sydney F. Duncan.)

The Witness: There should be no period after that. 20 grams of dust are fed into this test per hour with the airflow of 1200 cubic feet per minute passing through a filter of the size of Plaintiff's Exhibit 2.

The Court: That is not very much dust, is it? That would be 60 times 1200, or 7200 cubic feet, and 20 grams of dust. [91]

The Witness: Compared to the dust content of ordinary outdoor air, it is quite a lot.

The Court: I see.

The Witness: This is really an accelerated test.

The Court: What is the ordinary content of dust?

The Witness: The content of dust outdoors in the aid varies considerably, and it might be——

The Court: Well, on a clear day, not when a Santa Ana is blowing.

The Witness: About four or five grains per thousand cubic feet.

The Court: Is that what this means?

The Witness: No, that is grams, and I have to translate grains into grams to make the comparison.

There are 7000 grains in a pound—well, the exact ratio escapes me at the moment, but it is on the order of 10 or 20 times as much dust.

The Court: I have a table of weights and measures here.

(Testimony of Sydney F. Duncan.)

By Mr. Leonard S. Lyon:

Q. Now will you refer to the next curve in Exhibit 7, which also is reproduced in Exhibit 8, the curve being entitled, "Filter Performance With 20-40 Micron Dust." Tell us what that test was and what the date showed.

A. This curve is shown as Graph No. 3 in Exhibit 8, and is made with dust that is obtained from the AC Spark Plug [92] standardized air cleaner fine test dust by a further classification of that dust.

There are devices available to separate out of the so-called composite dust which was used in the test represented on Graph 1, to separate out of that composite dust a narrow band of particle sizes.

In the test run from which the lines of Graph 3 were obtained, the larger particles out of the composite dust were segregated and used as the test dust. 20 to 40 microns is not the largest, but you see it comprises approximately 18 per cent of the composite dust.

The test using the same filter in the same test set at the same velocity, same number of cubic feet per minute, and again feeding 20 grams of test dust per hour was retested. The result is that on the coarser dust particles this particular filter shows a very high efficiency, better than 98 per cent on the average; whereas on the composite dust the filter showed an efficiency which, as I said



(Testimony of Sydney F. Duncan.)

before, started at about 78 per cent and went down to about 72½ per cent or thereabouts.

The Court: What is this "one pound" down here?

The Witness: That is simply to mark the point on the grams scale of where one pound shows up.

The Court: That is where one pound of dust has been fed into the filter? [93]

The Witness: No, sir.

The Court: Or was in the filter?

The Witness: One pound of dust has been caught by the filter.

The Court: One pound of dust had been caught by the filter?

The Witness: Yes.

The Court: Going back to this comparison of 20 grams fed per hour—you say that is several times the dust content?

The Witness: That is many times the dust content of ordinary air.

The Court: Many times?

The Witness: Yes.

By Mr. Leonard S. Lyon:

Q. Referring now to these curves that you have explained to the court, have you made similar tests on other types of filters other than the filter of the patent in suit?      A. Yes, I have.

Q. Referring now to the same curves, you have called attention to the fact that the patented filter as shown by these curves has a high filtering efficiency and a low pressure drop and that both the filtering efficiency and the pressure drop remain

(Testimony of Sydney F. Duncan.)

constant for a long period of operation of the filter. [94]

Did you find that to be true of any other filter that you have tested?

A. It is true of a model or an example of the Air-Maze P-5 filter.

Q. Any other filter?

A. Not of filters of other designs that I have tested, unless they are filters built out of Farr media, either modified in dimension or thickness.

Q. In other words, it is your statement that the results you have referred to are unique to the structure of the patent in suit? Do you mean to say that?

Mr. Harris: That is objected to, if the Court please, as leading and suggestive, calling for a conclusion.

Mr. Leonard S. Lyon: I think he has already said it, but I wanted to make it clear. They can cross examine him all they want to. This is an expert witness.

The Court: Yes, it is leading and suggestive, but I will permit the question. Objection overruled.

The Witness: Yes, these results are unique to this type of construction.

By Mr. Leonard S. Lyon:

Q. Now looking at the inside back cover page of Exhibit 7, at the top of the page are some photographs with the legend, "The photographs above illustrate in part the wide variety and types of applications where Far-Air filters can be [95]

(Testimony of Sydney F. Duncan.)

utilized." Can you explain to the Court these different applications? I think it may help the Court in understanding how these filters are used.

The Witness: Most of these photographs referred to show installations where a number of filter panels are assembled in a holding frame and are used to take the dirt out of air entering some kind of a ventilating system.

In only one picture do I see an installation that is of a slightly different type of application, and that is in the lower picture at the extreme right. I believe, since a close examination shows that there is a cook in the picture, that these are filters to——

The Court: Where?

The Witness: This page, the inside back page.

The Court: I was looking at the wrong place.

The Witness: These are Farr filters used to collect grease droplets out of the air in a kitchen and prevent them from being deposited in the ducts and so constituting fire hazard.

By Mr. Leonard S. Lyon:

Q. That is true only of the photograph in the lower right-hand corner?      A. Yes.

The others are usual types of installations where a number of the filters are placed in holding frames and used to [96] handle large or small quantities of air.

These filters I believe are practically all 20 by 20s, that is, this commercial size of Exhibit 2, and if one makes an estimate of the number of panels and multiplies by 1200 CFM one may get an idea of the total airflow in any one of these cases.

(Testimony of Sydney F. Duncan.)

Q. Now will you go back to your description of construction of a patented Farr filter as set forth in the patent in suit and by reference to Exhibits 2 and 3. You were interrupted after you had explained to the Court the use of the crimped sheets of wire mesh arranged parallel to the flow of the air.

Now will you take up your description from there on?

A. The construction, as possibly shown a little better in Exhibit 3, shows the sheet of crimped screen—it could be called corrugated, I suppose, also but we usually refer to it as crimped screen—shows the crimped screen with changes in the direction of the crimp. This change in the direction of the crimp is referred to by us as a herringbone crimp and the herringbone pattern is produced by the rather abrupt change in direction of the crimp itself.

The function of the crimps is to provide passages through the filter. The function of the change in direction of the crimp is to provide a change in direction of this passage.

A further function of the crimps, of the sheet of crimped [97] screen, are to divide the panel up in both dimensions of its face so as to divide the airstream into many small filaments.

The flat screens, of course, do not contribute to the division of the panel in any but one direction. The crimps of the sheet of crimped screen contribute to the multiple subdivisions of the panel in both dimensions of its face.

(Testimony of Sydney F. Duncan.)

When air has passed through this filter, it flows in general parallel to the direction of the sheets of screen.

Stated another way, the sheets of screen are positioned on purpose so that the sheets are parallel to the intended direction of flow of the air or dust-laden gas, or whatever is being used .

The airflow then is quite obviously largely along the surface of the flat sheet of screen, but the airflow is not necessarily entirely along the surface of the screen which was crimped.

The airflow end approaching one of the passages formed by the crimp will flow partially down the passage and partially through the meshes of the screen walls of that passage.

This combined action of flow through the passage or along the passage and through the meshes of the screen produce a high degree of turbulence and mixing.

This turbulence or mixing action, combined with the fact that the passages are of not too great cross-section, places each dust particle as it enters the filter in rather close [98] juxtaposition with some dust collecting surface. The surface on which the dust is collected in this filter is the actual surface of the wire.

As I have said before, this filter before being used is dipped in oil. Other materials could be used, but oil is a handy and very effective adhesive and the individual wires of the screen are coated with oil. [99]



(Testimony of Sydney F. Duncan.)

By Mr. Leonard S. Lyon:

Q. Now, I hand you a series of photographs. There are eight pages of them.

Mr. Leonard S. Lyon: Will you mark these temporarily for identification as Exhibits 9-A——

The Court: 9-A, et cetera.

Mr. Leonard S. Lyon: The top one will be 9-A, through the alphabet to 9-H.

(The photographs referred to were marked Plaintiff's Exhibits 9-A through 9-H, for identification.) [100]

\* \* \* \* \*

Q. Now, will you refer to these photographs, Exhibits 9-A to 9-J, and state first whether you had these photographs made? [101]

A. I had all of these pictures taken and supervised their composition and the work that was done to produce this series of photographs.

Q. What are they for, to show what?

A. The purpose of this series of photographs is to show how the dirt collects on the individual wires of a Farr filter of the type shown in Plaintiff's Exhibit No. 2.

Q. Now, will you take up each one of these photographs in order and tell us what that particular photograph shows, and any comment you wish to make on it?

A. I refer, first, to photograph 9-H.

The Court: That is the little one?

The Witness: No. It is this one (indicating photograph), Your Honor.

(Testimony of Sydney F. Duncan.)

The Court: Oh, yes, 9-H. All right.

The Witness: This shows the test filter that was used to make these tests. The filter in this particular picture was taken apart, in two pieces, and the lower piece, or larger piece, is a picture of the front of the filter and at the end of the whole test series of the little piece sitting on top, which is just about full scale, full size, and labeled "Back," which is the back of the filter at the end of the test. The picture was taken just to——

The Court: It is not the back of the lower portion?

The Witness: It is not the back of the lower portion. [102]

The Court: No.

The Witness: But it is the back of the rest of the filter.

The Court: All right.

The Witness: (Continuing) This filter during test was assembled so that the flat screen and crimped screen were in contact, and the view of those two layers of screen as they were clean is shown in the photograph labeled 9-A, entitled on its face, "Clean Oiled Filter."

This small test filter was then installed in a small test duct which is built for seven- by seven-inch filters of the size shown approximately by an identified exhibit of defendants, A, I think. It is about that size.

And the same test dust as was described as being used in the tests of the large panel filter is fed

(Testimony of Sydney F. Duncan.)

into the air stream in a fairly heavy concentration, somewhat heavier than is used in the life test of the filter. 10 grams of this dust was fed into the air stream and that was called a load.

The test run was shut down and the filter was removed and very carefully separated at this pre-arranged plane and examined. I personally examined it each time—

The Court: In the photograph?

The Witness: And after 10 grams and 20 grams had been thrown at the filter, I felt that there was nothing we could see in a picture of this size, and so it wasn't until after [103] 30 grams had been loaded on the filter that we took the first picture, labeled "Exhibit 9-B," and titled on its front, "After 3 Loading Runs."

Examination of this picture shows that toward the lower part of the lower section of the separated filter there is a slight deposit of dust.

The Court: Is that the front or the back?

The Witness: That is the front of this filter.

The Court: Where the air was introduced?

The Witness: The air flow in each of these pictures is up, on both halves.

Now, there are a few places in photograph 9-B where a considerable dropping of oil is visible. These spots appear above the change in direction of the crimp, in each case, and should not be confused with the dust which is deposited toward the front or lower side of the filter in this picture.

After 40 grams of dust had been fed into the

(Testimony of Sydney F. Duncan.)

air stream, the filter was again separated and the picture 9-C was taken. In this picture it is quite obvious that dust has collected. I can point to it.

Mr. Leonard S. Lyon: Yes, I wish you would, to be sure.

The Court: It looks like the solid portion along the border.

The Witness: The solid portions along the lower half of the lower part of the filter are dust. That is slightly [104] bright and shiny looking. Up in the front part are still a few places where there is quite an oil supply.

It will be noticed that the dust has collected on a portion of the crimp that would be represented by the upstream side of the angled section near the face of the filter.

Since we are looking at only one side of the sheet of crimped screen, it is not obvious from the picture, but it can be—I observed it myself in the filter, that a similar deposit had taken place on the upstream side, on the underneath side of a crimp.

The Court: Upstream side?

The Witness: Upstream. If the air is flowing from left to right through Exhibit 3, then, the upstream side of a crimp would be this surface right here (indicating) which is angled to the air flow, and the dirt you see in photograph——

The Court: 9-C.

The Witness: ——9-C is collected on the top of that. Underneath, if we were to look up through

(Testimony of Sydney F. Duncan.)

the bottom of the back, we would see a similarly disposed portion of screen mesh passage wall that would show a similar dust deposit. It just doesn't show in the picture too well.

It should be stated or noted that the dust has deposited heavily at the front of the filter and lightly toward the back, and that there is no deposit of dust visible at this time in this photograph after the change in direction of the [105] crimp.

After loading 70 grams into the air stream, the results shown in photograph 9-D are obtained, and in this photograph it appears that the walls of the passages toward the front of the filter are becoming quite well loaded with dust and that some small amount of dust is visible, particularly towards the right-hand side of the photograph of the crimped portion of the filter.

There is dust deposited after the change in direction and that part of the filter is beginning to load up.

Examination of the flat screen in photograph 9-C shows an obvious deposit of dust on the flat screen. This deposit has not been as visible in other photographs, but examination with a magnifying glass at the time of the tests showed that dust was collecting on the flat texture during the entire test, but at a slower rate.

The dust was disclosed after loading 90 grams into the air stream, and the filters, upon being separated and photographed, gave the results of 9-E, where the filter is heavily loaded with dust



(Testimony of Sydney F. Duncan.)

toward the front part and in many cases quite heavily loaded with dust after the change in direction of the crimp.

The Court: That looks like it is almost caked there. Is that the top of the crimp or at the valley of the crimp?

The Witness: It is in along the sides of the crimp. [106]

The Court: Oh, I see.

The Witness: The flat screen contacts the top of the crimp, and so, as we separate the filter, we are bound to disturb some of the dust there. So that the flat cake that you see is deposited on the sides of the crimp.

The Court: Then, on the upstream side, on the right-hand side of each one of these ridges, it appears to be caked, and on the downstream side at the left side.

The Witness: That is after the change in direction of the crimp.

The Court: Yes.

The Witness: That is true. On the right-hand side of the ridges, as you refer to them, the crimps on the lower part of the filter, there will be a dirt deposit which can be seen, or could be seen from the back of the photograph, so to speak, that would look very much like the dirt deposit which is shown so obviously by the photograph.

Photograph 9-F is approximately a 10-diameter magnification of a portion of the flat screen in photograph 9-E and shows how the dirt is stacked

(Testimony of Sydney F. Duncan.)

up on the individual wires; the air flow in photograph 9-F, well, I can't say that it is from left to right, because nobody looks at it the same as I do—there is at one edge of the photograph a double line of wire. That side of the photograph is the upstream side, and the air has been blowing dust toward the wires. I think examination [107] of the little stacks of dust, as they are piled up on the wire on one side, will indicate that these stacks of dust were pointing into the air stream.

The Court: That the stacks of dust were pointing into the air stream?

The Witness: Were pointing into the air stream.

The Court: This would be indicated by 9-E?

The Witness: By 9-E, yes.

The Court: All right: 9-G?

The Witness: 9-G is an oblique view of the flat screen at the end of the test and shows the herring-bone pattern of dust deposit and its darkness at the upstream face of the filter and slightly shading off at the back.

9-H was taken before and was just taken to show what kind of a thing we had and that the back of the filter was relatively clean.

9-I and 9-J are enlarged details of the dust deposit shown in 9-E on the crimped portion of the filter.

9-J shows very definitely the heavy load toward the lower part of the photograph, that is, the part of the photograph which is actually in focus. With a short-focus lens and a curved focus, it is difficult

(Testimony of Sydney F. Duncan.)

to get the whole thing in focus. So the best focus is at the point where the air enters the filter, and the dust load tapers off. It is heaviest toward the air-entering side and progresses through the filter as the [108] meshes of the screen toward the front of the filter become clogged or partially clogged with dust, the air flows down the passage and deposits its dust on relatively clean screen toward the center of the filter.

Mr. Leonard S. Lyon: I have had Exhibit No. 8 and Exhibits 9-A to 9-J marked. I would like to have them formally received in evidence.

The Court: They will be admitted.

(Said Plaintiff's Exhibits Nos. 8 and 9-A, 9-B, 9-C, 9-D, 9-E, 9-F, 9-G, 9-H, 9-I, and 9-J, previously marked for identification, were received in evidence as aforesaid.) [109]

\* \* \* \* \*

By Mr. Leonard S. Lyon:

Q. Does Exhibit 8 show and describe the test apparatus employed in the test from which the curves you have identified in Exhibit 7 and Exhibit 8 were derived?

A. Yes. The test set is shown by photograph and in drawings and is described in words in Exhibit 8.

Q. Referring to Fig. 9, the photograph in Exhibit 8, is that test set shown at the rear of that photograph?

A. The large test extending from one side of the

(Testimony of Sydney F. Duncan.)

picture to the other side of the picture is the test set in which the full-sized, or 20 by 20 inch panel filters are tested.

Just a portion of a smaller test set built to accommodate 7 inch square filters is shown at the extreme left just about the middle of that photograph. It was in the large test set that the data was taken for the published curves [110] and the photographs of Exhibit 9 were made from a filter which was fed dust in the small test set shown just at the left of the picture.

Q. The large test set that you have referred to is adapted for continued operation to show whether or not the filter efficiency and pressure drop remain constant over a period of time?

A. The large test set is built so that it can be run almost continuously and it is in that test set that we determine the pressure drop characteristics, the efficiency characteristics and the dirt-holding capacity of the 20 by 20 panel filters.

Q. Over a period of time?

A. Over a period of time, yes. The test is run for anywhere from 20 to 100 hours depending upon the test conditions and the filter being tested.

Q. Now the small test set is adapted to test only 7 by 7 panels?

A. Yes. The actual inside of the small duct is 6 inches by 6 inches, and it is equipped with a blower that can produce much higher velocity than we can obtain in the large test set.

Q. I show you a photograph——

I will ask that this be marked Exhibit 10. [111]

(Testimony of Sydney F. Duncan.)

(The photograph referred to was marked Plaintiff's Exhibit No. 10 for identification.)

By Mr. Leonard S. Lyon:

Q. —and ask you if this is a photograph of the small test set you have referred to.

A. Yes, this is a photograph of the small test set.

Q. Is that test set adapted for measuring the characteristics of the filter over a period of time of operation or only for an initial measurement?

A. It can be used to measure filter characteristics over a period of time but it is not equipped with the automatic controls so we customarily use it for short duration tests of an hour or two perhaps to determine the initial characteristics or to determine the operation of the filter under extremely high dust concentration.

Q. Was this small test set the apparatus on which the tests were made which are shown in the photographs, Exhibits 9-A to 9-J?

A. Yes, it is.

Mr. Leonard S. Lyon: I will offer in evidence the photograph of the small test set as Plaintiff's Exhibit 10.

The Court: Admitted.

(The photograph referred to was received in evidence and marked Plaintiff's Exhibit No. 10. )

Mr. Harris: If the Court please, I would like to have [112] some foundation as to who owns



(Testimony of Sydney F. Duncan.)

this equipment shown in these photographs. I think that is part of the foundation.

By Mr. Leonard S. Lyon:

Q. Will you answer Mr. Harris' question? He wants to know who owns the equipment.

A. The Farr Company owns it.

The Clerk: Are all these photographs in evidence?

The Court: All these photographs are in evidence; 9 and 10, 9-A to 9-J and 10.

By Mr. Leonard S. Lyon:

Q. You have testified that you appeared as a witness in the trial before Judge Yankwich on the Green patent, which has been included in the defendants' book that has been marked here.

I show you a panel which has been marked Plaintiff's Exhibit 5 for identification and ask you if you can identify that panel.

A. (Examining exhibit) This panel is an example of the Air-Maze filter made according to the teachings of the Green patent and marketed, as far as I know, for a number of years.

Q. Can you recognize that as the panel put out by the Air-Maze Company under the Green patent which was involved in the suit before Judge Yankwich in which you testified?

A. This appears to me to be very similar to the filter [113] panels I remember seeing in that suit. Whether it is the identical one or not, I don't know.

Q. But you recognize that as a specimen of that panel?

A. A specimen of that filter.

(Testimony of Sydney F. Duncan.)

Mr. Leonard S. Lyon: I will offer in evidence the panel of the Green patent which the witness has just identified as Plaintiff's Exhibit 11.

The Clerk: It is already marked.

The Court: It is already marked 5, is it not?

Mr. Leonard S. Lyon: Excuse me. Exhibit No. 5.

The Court: Very well. Admitted.

(The article referred to was received in evidence and marked Plaintiff's Exhibit No. 5.)

By Mr. Leonard S. Lyon:

Q. Have you made——

The Court: On this panel, which is the upstream side, as you call it?

The Witness: This side with the coarse mesh screen on it is the upstream face, and this face with the fine mesh screen is the discharge or downstream face.

The Court: Is there just one fine mesh screen in the panel?

The Witness: This particular panel has holes at the bottom through which one may look and see the arrangement of the screen. There is a coarse screen for several layers and [114] then there is some finer screen. In this one there appears to be alternate layers of flat and crimped screen, and then there is a flat screen on the back of the filter.

There are several layers.

The Court: There appear to be three layers of fine mesh screen.

What is the size of the coarse mesh screen? What do you call that?

(Testimony of Sydney F. Duncan.)

The Witness: That appears to be about one-half inch or three-eighths mesh.

The Court: That is the size of the opening?

The Witness: Yes.

The Court: And you call the other one No. 14 screen?

Mr. Leonard S. Lyon: 14 mesh.

The Court: That is 14 holes per square inch?

The Witness: That is 14 holes per lineal inch.

This one on the back is about 14 mesh and would be determined by simply laying a ruler on and counting the holes in the lineal inch.

The Court: What is the front, the larger?

The Witness: It is approximately  $\frac{3}{8}$ .

The Court: Three-eighths per——

The Witness: Three-eighths of an inch per hole.

The Court: Per hole?

The Witness: Instead of about 14th of an inch per hole. [115]

The Court: I see.

By Leonard S. Lyon:

Q. In what direction relative to the flow through the filter do the sheets extend in this Exhibit 5?

A. The sheets in Exhibit 5 are perpendicular to the intended direction of flow of the air or medium to be filtered.

Q. Now will you contrast the operation of that filter with the operation of the Farr filter of the patent in suit?

A. In the operation of the filter, Exhibit 5, the filter is usually used oiled so that the air entering

(Testimony of Sydney F. Duncan.)

flowes through the meshes of each one of the layers of screen in sequence and as it flows by the individual wires of the screen in passing through the meshes the turbulence is caused and dust is deposited on the wires. [116]

\* \* \* \* \*

The Witness: As the dust load on the filter increases with time in service or time in test, the small meshes towards the back of the filter are clogged to a more or less extent, causing a rise in the pressure drop across the filter for a given air flow. With this filter, when tested or in service, eventually the pressure drop across the filter will rise to a considerable degree, because the small holes in the fine mesh at the back of the filter become plugged with dirt and so stop the flow of air.

This filter, then, in operation in a normal ventilating system would interpose an increasing and, towards the latter part of its life, a rather rapidly increasing pressure drop and so decrease the flow of air in the ventilating system, because in the ventilating system the fans are set to run at practically constant speed and there is no provision for increasing the speed of the fan or the total pressure produced by the fan to compensate for the increased pressure drop across the filter.

By Mr. Leonard S. Lyon:

Q. Have you tested in your large-scale test apparatus, which has been identified here, panels like Exhibit 5 and made [118] comparative tests in

(Testimony of Sydney F. Duncan.)

that apparatus of such panels with the Farr panels like Exhibit No. 2?      A. Yes, sir, I have.

Q. I hand you a sheet of curves, which I will ask be identified as Exhibit No. 11, and ask you if this exhibit records the results of those tests.

A. Yes, it does.

\* \* \* \* \*

(The sheet of curves referred to was marked Plaintiff's Exhibit No. 11 for identification.)

The Witness: The set of curves shown as Exhibit No. 11——

The Court: What kind of dusts were used, the same dusts [119] that were used in the other tests?

The Witness: The same dust has been used as in the tests described in the technical report, the tests described in the bulletin, Exhibit No. 7, and the same dust was used in loading the filters shown in the photographs, shown in Exhibits 9-A through 9-J. The same dust has been used in each one of these tests.

The Court: Including the tests of this product?

The Witness: Including the tests of a sample of this type of filter.

The Court: Exhibit No. 5?

The Witness: Exhibit 5.

Mr. Leonard S. Lyon: No. 5.

The Court: All right.

The Witness: The curves——

The Court: Well, you introduced the air at different speeds, did you not?



(Testimony of Sydney F. Duncan.)

The Witness: Yes, because at the time or approximately at the time when the Farr filter was first brought out, panels of this general type were rated at 800 cubic feet of air per minute, whereas, panels of the Farr type were rated at 1200 cubic feet of air per minute for the same size panel.

The two lower curves, labeled "Farr Pressure Drop at 519 Feet Per Minute" and the curve labeled "'Air Maze Type B' Pressure Drop at 346 Feet Per Minute," show that at the [120] beginning of this test the pressure drop across the two filters under these different conditions of velocity were approximately the same.

By Mr. Leonard S. Lyon:

Q. Now, will you explain to the Court a little further why you used these two different velocities for the two filters?

A. As I said, the two filters were rated that way when the Farr filter was first brought out.

Q. In other words, the earlier Air-Maze filter of this Exhibit No. 5 type, its rated flow was what, commercially?

A. 800 cubic feet per minute.

Q. And the Farr filter?

A. It was 1200 cubic feet per minute, just 50 per cent more air.

Q. So you made the comparative tests using the proper rated flow rates for each one of the two filters?

A. For each one of the two filters.

The Court: Who rated them? Where did you get the 800 cubic feet per minute rating?

(Testimony of Sydney F. Duncan.)

The Witness: That was a recommendation made to the trade.

The Court: By whom? By Air-Maze?

The Witness: By the people who sold Air-Maze filters.

The Court: Now, the graphs here—— [121]

The Witness : The pressure drop curve.

The Court: The pressure drop curve shows the pressure drop going up from——

The Witness: From a little over a tenth of an inch to a half inch for the Air-Maze Type B; and for the Farr filter from just about a tenth of an inch to just about 15/100 of an inch. It is to be noted that the curve for the pressure drop on the Air-Maze filter that I tested was stopped at a half inch of water; that the curve for the Farr filter actually, from the test data, the test was carried beyond the 1,000-gram loading, but the rest of the data was simply not plotted on this sheet. The curve continued on without any serious break, and just about its present level at the end of the curve.

By Mr. Leonard S. Lyon:

Q. Why did you terminate the test insofar as the Air-Maze device, Exhibit No. 5, was concerned, when you had reached the point indicated on the exhibit?

A. According to a more or less generally accepted standard by the people who manufacture filters, but no particularly codified, there is a point at which we say the filter has reached its dirt-holding capacity. One of the specifications that

(Testimony of Sydney F. Duncan.)

has been suggested and adopted in some areas is that, for this particular type of filter, if the pressure drop across the filter reaches half an inch of water, then, the filter is at the limit of its dirt-holding [122] capacity and should be removed from the air stream and cleaned or reconditioned.

Another specification for determining when a filter has reached its dirt-holding capacity is that such capacity shall have been considered to be reached when the efficiency of the filter drops to 85/100 of the initial efficiency.

The Court: Now, this efficiency line shows that the Air-Maze has increased in efficiency——

The Witness: That is correct.

The Court: ——the dirtier it got.

The Witness: The dirtier it got, the better strainer it was, because as the small openings in the fine mesh became plugged, there were smaller and smaller holes for dirt particles to pass through, and so the collecting efficiency rose. However, the pressure drop also rose to be about five times its original value.

Whereas, the pressure drop in the Farr filter shown on these curves only rose to be about one and a quarter times its initial value, and that at 1,000 grams loaded on a 20-by-20 panel compared to the 860 or so grams loaded on the Air-Maze.

By Mr. Leonard S. Lyon:

Q. Now, as shown by this Exhibit No. 11, does the earlier Air-Maze filter of Exhibit 5 type have the characteristic performance which you have explained as had by the Farr filter of the patent in suit? [123]

A. No, it does not.

(Testimony of Sydney F. Duncan.)

Q. Will you point out to the Court wherein Exhibit No. 11 shows this difference?

A. Exhibit No. 11 shows this difference principally in the shape of the pressure drop curve. In the Farr filter, even though the velocity is 50 per cent more than through the Air-Maze filter I tested, the pressure drop rose very slowly, due to the fact that there are passages through the filter allowing the air to by-pass dirty screen, encountering farther into the media some clean screen, and so resume the flow partially through the screen and partially along the passages.

The efficiency curves of the Farr filter and the Air-Maze filter show that the Farr filter, having an efficiency quite—well, it is a little higher in this particular test—the efficiency of the Farr filter decreases as it becomes dirty, thus showing that, as the screen becomes loaded with dirt, the air by-passes the dirty screen and, encountering cleaner screen farther into the media, begins to deposit dirt. After the dirt load has reached the bend in the screen, then the air is channeled down the first portion of the herringbone pattern crimp and encounters a change in direction at the crimp, thus re-establishing, if it has been disturbed, the partial flow through the screen and through the mesh.

When dirt begins to clog up the openings well into the filter, the flow is then down coated channels and very [124] little dirt deposit takes place. The efficiency, then, of the Farr filter decreases.

In the Air-Maze filter, there are no passages through which the air may by-pass dirty screen,

(Testimony of Sydney F. Duncan.)

and the increasing degree to which the fine meshes are plugged causes a rise in efficiency.

Actually on this particular test, at two point, the velocity in the duct was increased to 1200 cubic feet per minute at a point.

The Court: On?

The Witness: On the Air-Maze filter.

The Court: Yes.

The Witness: To give some kind of comparison between the pressure drop across the Air-Maze at the Farr capacity, at 500 grams into the load on the filter, this pressure drop was measured as .34 inches of water, just about three-eighths of an inch of water. At the end of the test, or 860 grams, the velocity was again increased on the Air-Maze to pass 1200 cubic feet per minute, and the pressure drop across the filter was .93 of an inch of water.

The Court: It is not charted.

The Witness: No, it is not charted because of the difference in capacity. .93 of an inch, incidentally, would be off of the page on the pressure drop scale. [125]

If the two pressures at 1200 CFM are compared, then we see that at 860 grams load the Farr filter has approximately  $13/100$  of an inch pressure drop and the Air-Maze filter would have a  $93/100$  of an inch pressure drop.

These characteristics of the curves show that there is a different type of operation taking place in the collection of dust by the filter.



(Testimony of Sydney F. Duncan.)

Mr. Leonard S. Lyon: Exhibit 11 is offered in evidence as Plaintiff's Exhibit 11.

The Court: Admitted.

(The article referred to was received in evidence and marked Plaintiff's Exhibit No. 11.)

[Printer's Note: Plaintiff's Exhibit 11 is reproduced in Book of Exhibits.]

By Mr. Leonard S. Lyon:

Q. You have used the terms "filter efficiency" and "filter capacity" in your testimony. You have already explained how filter efficiency is determined. Is filter capacity the same as filter efficiency? If not, what is it?

A. Filter efficiency is strictly a measure of the ability of the filter media to take dust out of the air.

The capacity of the filter could be either one of two things and is sometimes referred to, one is the dirt-holding capacity (of which I spoke) and the other one is its ability to handle a certain volume of air in cubic feet per minute.

Usually the 20 by 20 filter size, which is the size of these two exhibits, Exhibit 2 and Exhibit 5, is the capacity [126] of that particular size as given in most manufacturers' literature.

The Court: What, the dirt capacity?

The Witness: The air capacity.

The Court: The air capacity?

The Witness: Yes.

The Court: That is what you refer to here by 800 cubic feet per minute capacity and 1200?

(Testimony of Sydney F. Duncan.)

The Witness: Yes, sir, that is the air capacity, the ability of the filter to handle a certain volume of air.

By Mr. Leonard S. Lyon:

Q. Am I correct, do you mean to state that the filter of the patent in suit had a greater capacity than the filter of the Exhibit 5 type?

A. Yes, it has, about 50 per cent more at comparable pressure drops and efficiencies.

The Court: Is there any advantage or disadvantage in that?

The Witness: A definite commercial advantage in that the total area occupied by a bank of these filters to handle a given quantity of air will be smaller if our filters are used. It will be only about two-thirds of the area necessary with the lower air capacity filters.

By Mr. Leonard S. Lyon:

Q. In an air-conditioning system such as might be employed [127] in a building like this, where would the filter panels usually be located in the building?

A. Well, they can be located at a variety of places. Some of them are on the roof and some of them are located in the basement.

The Court: Are they located at the outlets such as the outlets here in this room?

The Witness: No, they are not. They are generally located close to the fans.

The Court: Close to the intake?

(Testimony of Sydney F. Duncan.)

The Witness: Close to the intake, because one of the functions of the filters is to prevent the deposit of a lot of dust in the duct system itself. By Mr. Leonard S. Lyon:

Q. Can you tell us to what you attribute the increased filter capacity of the design of the patent in suit as compared with Exhibit 5?

A. Well, the increased filter capacity dust to the essential features of the construction of the Farr filter; that is, in the Farr filter we have many layers or sheets of crimped screen mesh in which the crimps form passages through the filter.

A second feature of course is the fact that the crimped screen divides the face of the panel into a multiplicity of subdivisions in both dimensions of the face of the panel. [128]

And the third feature is that in the Farr filter the passages formed by the crimped screen are at angles, one portion with respect to the other so that the passage includes a rather abrupt change in direction.

And these things contribute, singly and in combination, to the superior dirt-holding capacity found in the Farr filter.

Q. Are you familiar with the standards or requirements that were expected to be met by air filters such as Exhibit 5 at the time the Farr filter was first brought on the market?

A. I studied the test procedures used by various laboratories to determine filter efficiency and studied the equipment that was used.

(Testimony of Sydney F. Duncan.)

Q. What effect, if any, on these requirements was had by the advent of the Farr filter, the patent in suit, if you know? [129]

\* \* \* \* \*

The Witness: The effect was that through the greater air handling capacity of the Farr filter, installations were possible occupying less area and so it made a more economical construction job for the users.

The superior dirt-holding capacity made for less maintenance of the filter, so it cost less to keep the filter clean.

The Court: In the business of supplying filtered air in an air-conditioning system, are there any general standards by which the amount of air, that is, the required amount of air, are established? For instance, here is a room this size. Now in the air-conditioning business are there some standards which say that a certain number of cubic feet of air should be introduced into this room every so often?

The Witness: No, sir. Requirements vary considerably depending on the occupancy of the room or the requirement of the room. They are usually specified or quite commonly specified as so many air changes per hour.

The Court: Other than for special purposes, such as, for instance, in a meat storage house or a warehouse or anything where people are working and living, that is where most installations are, are they not?

(Testimony of Sydney F. Duncan.)

The Witness: Yes.

The Court: Well, now, is there some standard on the air changes per hour? [130]

The Witness: We might have anywhere from two to seven or eight air changes per hour in occupied space.

The Court: Then your testimony is that by virtue of the increased capacity it costs less to install the Farr filters and to produce a greater amount of air?

The Witness: Or the same amount of air.

The Court: Or the same amount of air?

The Witness: Or to handle the same air.

The filters do not dictate the amount of air that we need in this room; it is the use of the room that dictates the amount of air.

Then it is up to someone to design a filter installation that will handle that amount of air on some kind of an economical basis.

The Court: Well, they solved it here by pasting a paper over the thermometer so that nobody can tell how hot or cold it is.

The Witness: There is one other difference between Exhibit 2, the Farr filter, and Exhibit 5, the Air-Maze filter, and that is that the Farr filter, through the fact that it has rather sizable passages through it, is a good deal easier to clean than the Exhibit 5 filter.

The Court: How are they cleaned?

The Witness: There are a variety of methods.

The Court: Do they wash them with gasoline?



(Testimony of Sydney F. Duncan.)

The Witness: You wash them with—well, gasoline might be used except it is a little dangerous. But usually they are sprayed with water and then washed with a spray of caustic solution, rinsed with water, dried and put back in service.

In the fine screen through which everything has to flow in the Air-Maze filter of the type of Exhibit 5, it limits the size of the passage, the size of the hole, through which the dirt can be washed.

In the Farr filter the dirt collects as shown in the photographs of Exhibit 9-A through J on the wires adjacent to the passage and this dirt can be loosened with a spray of water or caustic and comes out into the passage and goes through the filter by passing through the passage rather than having to pass through the fine mesh screen.

The cleanability, of which there is no particular measure, incidentally, but in practice I have observed that the Farr filter is easier to clean than a filter having fine mesh screen through which everything has to go.

By Mr. Leonard S. Lyon:

Q. Are you familiar with the P-5 Air-Maze filter panel?

A. I have examined some panels labeled so, and I think I am familiar with them.

Q. Have you made various tests on them?

A. Yes, an Air-Maze P-5 panel was tested in our large [132] test duct using the same—

The Court: Are you through with this one for the moment?

(Testimony of Sydney F. Duncan.)

Mr. Leonard S. Lyon: Yes, Your Honor.

The Court: The clerk will remove it.

By Mr. Leonard S. Lyon:

Q. Had you finished your statement?

A. I think so. I said I had tested an Air-Maze P-5 filter in the large test duct.

Q. I show you a 20 by 20 air filter panel and ask you if you can identify that as one of the Air-Maze P-5 filter panels.

A. I think it is one of the Air-Maze P-5 panels.

The Court: Is it so labeled?

The Witness: It has a P-5 stamped up here in the corner and this particular one doesn't have another nameplate.

Another filter which looks just like this has "Air-Maze P-5" stamped on a little brass plate so that examining these two filters together previously I determined that they were the same filter, the same kind of filter.

Mr. Leonard S. Lyon: Mr. Baldwin, do you see anything wrong with this filter as being an Air-Maze P-5 filter panel?

Mr. Baldwin: It is hard to tell, Your Honor, because from the face the P-5 obsolete and the P-5 look the same.

However, I won't question it at this time.

The Court: You have a P-5 obsolete here, the one that [133] you were showing, have you not?

Mr. Baldwin: We have a small sample, Your Honor. It is on the desk .

Mr. Harris: It is labeled Defendants' Exhibit A for identification.

(Testimony of Sydney F. Duncan.)

The Clerk: It is not in evidence.

The Court: No, just for identification.

Mr. Baldwin: I think this is the P-5.

The Court: The current P-5?

Mr. Baldwin: Yes.

The Court: Do you so stipulate?

Mr. Baldwin: So stipulated.

The Court: Very well.

Mr. Leonard S. Lyon: We will offer the panel just identified as Plaintiff's Exhibit 12.

The Court: Admitted.

(The article referred to was received in evidence and marked Plaintiff's Exhibit No. 12.)

By Mr. Leonard S. Lyon:

Q. Have you dismantled panels like Exhibit 12 and examined the filter medium therein?

A. Yes, I have.

Q. I show you an exhibit marked Exhibit 6 and ask you if you can identify this exhibit.

A. (Examining exhibit.) [134]

The Court: This Exhibit 12 has the heavy wire over the edge.

The Witness: It has a protecting layer of expanded metal over the face, over each face.

The Court: Is not the wire the same as expanded metal?

The Witness: No, expanded metal is made out of sheet and slit and deformed to come out this way, whereas the wire mesh——

The Court: This is not wire?

(Testimony of Sydney F. Duncan.)

The Witness: While the wire mesh material is woven like cloth.

The Court: Very well:

By Mr. Leonard S. Lyon:

Q. The practice of mounting a grille in front of these or back or either one to protect these filters is common to all these various filters, is it not?

A. Yes.

Q. The plaintiff sometimes puts grilles on its filters? A. Oh, yes.

Q. And do the grilles perform any part of the filtering operation? A. Almost none.

Q. Why?

A. In the first place the holes are rather large, there is only layer of it that could collect dust, so that the [135] grille itself doesn't have much dust-holding capacity, and it is so shallow that it cannot act as a very effective filter.

Q. What are the grilles used for?

A. The grilles are used to protect the surface against accidental bumps, to improve handling, to perhaps make the filter a little more rigid which it is taken out for cleaning, and various reasons of that sort.

Q. I have handed you Exhibit 6 and ask you if you can identify that exhibit.

A. These are sheets of crimped screen taken from an Air-Maze P-5 filter and bound together at one end just for purposes of examination and illustration of the construction of the filter media in the current Air-Maze P-5 filter.

(Testimony of Sydney F. Duncan.)

Q. I would like you to compare this Air-Maze P-5 filter material with the filter material of the Farr patent in suit. First, is it made of screen mesh?

A. Yes, it is made of screen mesh or wire screen. This media has sheets of crimped screen or wire screen positioned parallel to the intended flow of the medium to be filtered. These crimps, when the filter is packed, form a multiple subdivision of the panel in both dimensions of the panel and these crimps change in direction twice instead of once.

Q. The Farr patent in suit shows one change?

A. Shows one change in direction, where this medium [136] shows two changes in direction rather close to the surface of the filter panel.

Q. Does the P-5 Air-Maze filter material, does it have any flat sheets?

A. The filters that I have seen labeled P-5 do not have flat sheets in them.

Q. Based on your tests and studies of the filter of the Farr patent in suit, are the characteristic performances of that filter or its increased filter capacity dependent on the presence of flat sheets in the filter medium?

A. Not necessarily.

Q. Have you made a comparative test in the large-scale test apparatus which you have heretofore identified using a P-5 Air-Maze 20 by 20 filter panel like Exhibit 12 and a Farr 20 by 20 filter panel like Exhibit 2?

A. Yes, I have.

Q. Have you recorded the results of those tests on a paper that can be produced here in court?



(Testimony of Sydney F. Duncan.)

A. I have some curves here——

The Court: Mark it 13.

(The document referred to was marked Plaintiff's Exhibit No. 13 for identification.)

The Court: This is another graph?

Mr. Leonard S. Lyon: This is another graph, Your Honor.

The Witness: This is another graph. [137]

The Court: This is a graph on the type P-5?

The Witness: Yes, sir.

By Mr. Leonard S. Lyon:

Q. Now will you state how these tests were made and tell us what the results of the tests were and explain the recording of those tests on this Exhibit 13?

A. In the tests shown on Exhibit 13, which is a curve sheet labeled "Comparative Filter Performance, 20 x 20, 2 Inch Panels," the air velocity for both the Parr filter and the Air-Maze filter were the same. That is just another way of saying that each one of the filters was handling 1200 cubic feet of air per minute in the test at the time.

Q. Did you find that the P-5 filter has the same increased filter capacity that you have said is provided by the Farr patented filter?

A. Very close to the same. The two curves——

The Court: The same dust?

The Witness: The same dust as previously used, fed at the same rate as the tests shown in Exhibit 11. It was the same test set.

(Testimony of Sydney F. Duncan.)

The three filters involved——

The Court: Well, it was the same rate.

The Witness: Twenty grams of dust per hour.

The Court: Not as Exhibit 11 but in Exhibit 11 you had two? [138]

The Witness: I had two air rates but the same dust rate. It was 20 grams of dust fed per hour.

Actually in Exhibits 11 and 13 there are three filters involved. One is the Farr, what we call the old type Air-Maze or Type B, and the third filter is the Air-Maze Type P-5.

The efficiency and pressure drop curves for the Farr filter on Exhibit 11 and Exhibit 13 are the same curve. They are plotted from the same data.

The dust fed to all three filters was the same dust, the same kind of dust as far as any kind of standardization could make it.

The oil used to coat the wires with some adhesive was the same for all three filters.

The test method was the same for all three filters.

The test equipment was the same for all three filters.

The only difference in treatment of the three filters is that the Air-Maze P-5 was tested at 1200 cubic feet of air per minute and the Air-Maze Type B shown on Exhibit 11 was tested at 800 cubic feet of air per minute.

By Mr. Leonard S. Lyon:

Q. What is the rate of capacity, if you know, of the Air-Maze P-5 filter panel?

A. I don't know what Air-Maze rates it at, but

(Testimony of Sydney F. Duncan.)

the filter performs quite well at 1200 CFM. [139]

The efficiency of the Air-Maze P-5 is shown in the dashed line on Exhibit 13 and is slightly lower than the solid line which shows the efficiency of the Farr Type 44, or the filter Exhibit 2.

It will be noted that the pressure drop of the Air-Maze P-5 filter follows the pressure drop of the Farr filter almost exactly as nearly as we could measure it, at least from zero grams dust load out to 400 grams dust load on the filter. At this point the pressure drop of the Air-Maze P-5 rises a little faster than the pressure drop of the Farr Type 44.

Q. Will you explain whether or not the curves on Exhibit 13 show that the Air-Maze P-5 filter has a characteristic performance of the Farr patented filter as you have heretofore explained it?

A. Since the curves on Exhibit 13 are very like each other for the Farr filter and the Air-Maze P-5, it appears that the filters perform in similar manner.

However, further examination would have to be made of the performance of the Air-Maze P-5 to determine whether or not this similarity of efficiency and pressure drop characteristics was due to a similarity of internal action or to some other factor.

Q. What examination of that kind have you made?

A. A 7 by 7 filter similar to the one used in producing [140] the photographs of Exhibits 9-A

(Testimony of Sydney F. Duncan.)

through J was constructed and tested in a fashion similar to the test run on the filter that produced the photographs of Exhibit 9.

Mr. Leonard S. Lyon: At this time I will offer in evidence Exhibit 13.

The Court: Admitted.

(The document referred to was received in evidence and marked Plaintiff's Exhibit No. 9.)

[Printer's Note: Plaintiff's Exhibit 13 is reproduced in Book of Exhibits.]

By Mr. Leonard S. Lyon:

Q. Can you produce the photographs that you last referred to?      A. Yes, I have a set here.

The Court: By the way, how do you account for the fact that the efficiency rating of the Air-Maze dropped faster than that of the Farr?

The Witness: There is a little less screen I think in the Air-Maze P-5 than there is in the Farr filter.

The Court: Due to the fact that you have the flat screen in between?

The Witness: Not necessarily. The Farr filter tested has four layers or sheets of crimped screen per inch, and the Air-Maze P-5 has five. The mesh of the screen is not identical in the two filters.

The Court: What is that in the P-5?

The Witness: The P-5, I think, is a 16-mesh screen. It is a little difficult to determine without a flat piece to look at. The mesh is somewhat distorted by the action of the crimping machine.

(Testimony of Sydney F. Duncan.)

By Mr. Leonard S. Lyon:

Q. You have produced, in response to my last request, a series of seven photographs, which I will ask to be marked as Exhibits 14-A, 14-B, 14-C, 14-D, 14-E, 14-F, and 14-G.

(Said photographs were marked Plaintiff's Exhibits Nos. 14-A, 14-B, 14-C, 14-D, 14-E, 14-F, and 14-G, for identification.)

\* \* \* \* \*

Q. Were the tests shown in the Exhibits 14-A to 14-G made in the small test apparatus which you have heretofore identified?

A. Yes, they were. [142]

Q. And were they made under exactly comparable conditions to the tests shown in Exhibits 9-A to 9-J?

A. Yes, they were made with the same apparatus, with the same air velocity. The filters were oiled with the same oil and allowed to drain the same length of time.

The Court: With the same dust?

The Witness: And the same dust was fed in 10-gram increments, in the same fashion as the tests run that produced the photos of Exhibits 9-A through 9-J.

The Court: And in the same quantity?

The Witness: In the same quantity per run. Not the total same amount.

The Court: I understand.



(Testimony of Sydney F. Duncan.)

By Mr. Leonard S. Lyon:

Q. Will you take the photographs showing these runs with the Air-Maze P-5 filter and point out to the court what the photographs show?

A. The same small filter frame was used.

The Court: Which way was the flow of air on these, incidentally, from top to bottom?

The Witness: The flow of air in the photographs in Exhibit No. 14 is from the top to the bottom.

The Court: Instead of from bottom to top?

The Witness: Instead of from bottom to top. My photographer just took them the other side up.

The first photograph shows the two parts of the filter separated and shows the media as it was clean and oiled before any dust had been fed to it.

Then, after each 10-gram increment of dust feed, the filter was separated and the inner face examined.

Photograph 14-B shows the condition of the filter after 20 grams of dust had been fed into the air, and it is to be noted that the light areas in the upper part of the lower half of the filter are dust deposits on the wire. The air was entering from that side. These same dust deposits are not quite so clearly visible in the upper half of the filter, but there is an indication that the progressive type of loading previously described, in talking about the photos of Exhibit 9-A through 9-J, is taking place.

The dust load in 14-B appears up to the first change in direction of the crimp.

In 14-C, 30 grams of dust had been fed to the filter and the light areas in the first short section

(Testimony of Sydney F. Duncan.)

of the crimp and in the middle section of the crimped sheet of screen are dust deposits on the wire.

The deposit in the middle section is caused by the change in direction of the crimp.

After 40 grams of dust had been fed to the filter, the appearance of the inner face was as is shown in photograph 14-D, and in 14-D a small amount of dust is seen to be [144] deposited on the wires near the downstream face of the filter, which is the lower part of each section of the filter.

The Court: At the extreme edge?

The Witness: At the extreme edge, yes.

After 50 grams of dust had been fed, the inner face of the separated filter panel looked as in 14-E. The heavy dust deposit near the top of the filter, which is the upper side of each piece, has almost closed many of the openings.

Careful examination shows that in the bottom of some of the crimps, dust deposits can be seen as if they were on the other side of the wire where the air was passing through a passage through the filter below the layer of screen that is visible on the top of the separated filter.

Exhibit 14-F is a close-up of one portion of the screen and is characteristic of the dust deposit on the crimped screen sheet.

By examination of the intensity of the deposit, it appears as to which way the air is flowing.

There is no particular distinguishing mark that I can call attention to, but on one edge of the filter,

(Testimony of Sydney F. Duncan.)

of the photograph, there is quite a heavy dust deposit. On the opposite edge, more clean wire is observed.

The Court: The air flow on this is from this way (indicating), or what is it? [145]

The Witness: On the copy of the photograph, it is from left to right, yes.

The Court: It appears to me as though there is dust on all the wires going crosswise in the direction of the flow. None appear to be clean.

The Witness: They have all, so far as I **can** observe, accumulated some dust and in each case on the upstream side of the wire, just as was shown in the similarly enlarged views of the Farr type filter, the photographs of which are Exhibit 9.

The last picture, Exhibit 14-G, is a photograph taken at approximately 10 diameters magnification of the dust deposit on the wires, and it is seen that the dust deposit is of the same general character as was observed in Exhibit No. 9.

By Mr. Leonard S. Lyon:

Q. You have testified that the medium in the P-5 Air-Maze filter forms multiple subdivisions both in a horizontal dimension and in a vertical dimension. [146]

\* \* \* \* \*

The Court: I think he testified to that when he was describing it.

The Witness: I believe I did.

(Testimony of Sydney F. Duncan.)

By Mr. Leonard S. Lyon:

Q. You so intend, do you not, to testify?

A. I did.

Q. Yes. Now, I show you a catalog of the defendant Air-Maze Corporation for the P-5 filter, Exhibit No. 4. On the second page of this catalog, in the lower right-hand corner, are two illustrations. Will you refer to the first or top of those illustrations and point out to the Court whether or not such illustration shows the multiple subdivisions that you have referred to?

A. The picture referred to, on page 2 of Exhibit No. 4, shows what appears to be a face view of the P-5 media. If one were to assume that a particle entered one of these openings on the face of the filter and tried to go laterally immediately after entering the opening, it would encounter a [147] wire mesh through which it would have to pass in going laterally to the air flow. The fact that from the photograph it appears that the wire mesh would have to be traversed or passed through in any direction of lateral travel of a particle, this media subdivides the filter panel in both dimensions of the face of the panel into a multiplicity of subdivisions. [148]

Q. I show you a plastic specimen which consists of one relatively larger piece and two smaller pieces and ask you if you produced this specimen.

A. Yes, I did.

Q. What is it and what did you produce it from?

(Testimony of Sydney F. Duncan.)

Mr. Harris: If the Court please, may we examine it before the witness answers?

The Court: Certainly.

(Counsel examining exhibit.)

By Mr. Leonard S. Lyon:

Q. Go ahead, Mr. Duncan.

A. This 3-piece plastic exhibit was made by taking some Air-Maze P-5 media, enclosing it in a mold and pouring the mold full of some relatively clear plastic casting material.

The specimen was cured and then sawed into the three pieces, and the cut faces were polished down so as to produce if not a transparent specimen, at least one which is relatively good in transmitted light at seeing how the Air-Maze P-5 media acts through the various layers of the filter.

Q. Will you show the court by reference to this plastic model just what the Air-Maze media P-5 is inside the filter?

The Court: Let us give this an exhibit number. What is the next number?

The Clerk: No. 15. [149]

The Court: 15-A, B and C.

Mr. Leonard S. Lyon: The large piece we will call 15-A, the next largest piece 15-B, and the long one we will call 15-C.

(The specimens referred to were marked Plaintiff's Exhibits Nos. 15-A, 15-B and 15-C for identification.)



(Testimony of Sydney F. Duncan.)

The Witness: Exhibit 15-A, looking at it from the side, shows the characteristic so-called Z pattern of the Air-Maze P-5 media.

Looked at from the long face of Exhibit 15-A, it can be seen that the little tunnels alternate in direction as they go down into the filter, showing that this media was stacked in the fashion of the filter panel.

The Court: The wire is in there?

The Witness: The wire is in there. This is the screen still left in place.

The thin piece, which I think is identified as 15-C, is thin enough so that when held against the light and looked through one can see the multiple subdivisions of the panel in both dimensions. The screens contact each other and subdivide the panel in both dimensions.

This thicker section, which is identified as 15-B, is near the center of the media and shows again the multiple subdivision of the panel as we look through the plastic mounted specimen. [150]

The Court: This was a clean specimen, was it?

The Witness: The wire?

The Court: Yes.

The Witness: Yes. There was no dirt on this specimen. There is a little oxidation here and there, but no dirt.

By Mr. Leonard S. Lyon:

Q. Now will you refer to the printed matter on the second page of Exhibit 4, and first I will read to you the paragraph commencing at the bottom of the first column:

(Testimony of Sydney F. Duncan.)

“Because of its remarkable efficiency at high velocity, its low static pressure drop and large dirt-holding capacity, the Air-Maze P-5 filter is particularly adapted to installations where no space exists for plenum chambers in front of coils, or where ‘V’ or ‘U’ type filter banks are not practical.”

Now what is referred to here as you understand this statement by “its remarkable efficiency at high velocity”?

A. This must refer to the test results shown on Exhibit 13 wherein there is an efficiency curve at 1200 CFM for a filter of this type.

Q. Next the text refers to “its low static pressure drop.” Have you pointed out what that refers to in connection with Exhibit 13?

A. In Exhibit 13 the lower curve shows that the static [151] pressure drop is just about 1/10 of an inch of water through at least half the life of the filter, and that is generally considered low for 1200 CFM.

Q. The sentence then continues by referring to “large dirt-holding capacity.” Has that been indicated in the test, and if so, where?

A. The dirt-holding capacity was mentioned before on the basis of trying to define what is dirt-holding capacity. I believe I pointed out that there is no codified standard of what is dirt-holding capacity, but that the filter is expected to be cleaned when its efficiency drops to 85/100 of the initial value.

On the test which I made on the Air-Maze P-5, this dirt-holding capacity was reached at approxi-

(Testimony of Sydney F. Duncan.)

mately 970 or 980 grams of dust on the filter, which is a pretty good dirt-holding capacity.

Q. In the paragraph immediately above the following appears:

“More than a million tiny openings in every 20 x 20 panel literally ‘scrub’ the air free from dust, dirt, and impurities, causing them to deposit evenly on viscous-coated wire baffles. At the same time the ‘Z’ shaped channels (see illustration at right) provide large areas for dirt storage so that flow of cleaned air is almost [152] unimpeded. As a result, the P-5 handles more air, with less servicing than ordinary types of filters.”

Now will you state whether or not your tests have confirmed these statements and wherein you have referred to those tests and also call attention to the illustration at the right of the statement.

A. One thing I must say, and that is I do not know what filter or filters the writer of this paragraph had in mind when he said “ordinary types of filters.” If he was referring to something similar to the old model of Air-Maze filter, made according to the Green patent, then his statements are true as shown by my test results in Exhibits 11 and 13.

Q. Now referring to the uppermost of the two illustrations, in the lower right-hand corner of page 2 of Exhibit 4, the legend reads, “Air enters crimpers layers of galvanized wire mesh at 180 degrees. ‘Z’ shaped channels provide large areas for dirt storage with minimum impedance to air flow.”

Will you compare that with the teachings——

(Testimony of Sydney F. Duncan.)

The Court: What about 180 degrees? I do not see anything about 180 degrees.

The Witness: I believe it does, Your Honor. That is the figures "180" with the little zero above it which means 180 degrees.

The Court: Where are you reading from? [153]

The Witness: The caption at the right, or rather at the left of the upper picture.

The Court: I see.

Mr. Leonard S. Lyon: I will start the question over again.

Q. Will you compare the statements contained in that legend with the teachings of the Farr patent in suit?

A. In the legend it says that air enters crimped layers of galvanized wire mesh. In the Farr patent this same condition is described where air enters crimped layers of wire mesh. I don't believe there is any specification of galvanizing necessary in the Farr patent.

In the Farr patent there are no Z shaped channels but there are channels or passages with a change in direction of approximately the same degree as are shown in the media of the P-5 filter.

The statement in the caption that the channels provide large areas for dirt storage might be a little confusing in the light of the photographs shown in Exhibit 14-A to G where it is shown quite clearly that the dirt storage is on the wires and not as you would shovel dirt into a trough which might be construed to be the channel.

With minimum impedance to airflow, that state-

(Testimony of Sydney F. Duncan.)

ment is apparently clear enough. As a result of having passages through the filter with changes in direction and having [154] provided a construction that is able to actually store dirt on the surface of those passages, the passages are left open so there is a reduced impedance to airflow compared to many other styles of filters.

By Mr. Leonard S. Lyon:

Q. Mr. Duncan, do you find any essential difference in the construction of the filter medium in the P-5 Air-Maze filter and the Farr filter of the patent in suit? A. I see no essential difference.

Q. Do you see any substantial difference in the method of operation of the two filter media?

A. No, I do not.

Q. Do you see any substantial difference in the results obtained by those two filter media?

A. There is no really significant difference that couldn't be accounted for by slight changes in design.

Q. What do you mean by that?

A. For instance, there is no requirement that either the Air-Maze or the Farr filter be made out of any particular wire size. It might be 14 mesh or 16 mesh or 18 mesh. There isn't any requirement that either one of the filters be packed three layers to the inch or four layers to the inch or five layers to the inch, and these factors of wire mesh size and numbers of layers to the inch will affect the pressure drop characteristic and the efficiency characteristic [155] of the filters.



(Testimony of Sydney F. Duncan.)

Q. Assume that the two filter panels are made on a comparable basis as far as all of those factors are concerned, will you state whether or not, according to your findings, the two filter media obtain substantially the same result?

A. They do obtain substantially the same results as are shown by the very similar shape of the pressure drop in the efficiency characteristic curves on Exhibit 13.

Mr. Leonard S. Lyon: At this time I will offer in evidence the folder of the Air-Maze Corporation for its P-5 type air filter panel as Exhibit 4.

The Court: Admitted.

(The folder referred to was received in evidence and marked Plaintiff's Exhibit No. 4.)

Mr. Leonard S. Lyon: At this time I will offer in evidence the specimen of the P-5 Air-Maze filter medium as Exhibit 6.

The Court: Admitted.

(The folder referred to was received in evidence and marked Plaintiff's Exhibit No. 6.)

Mr. Leonard S. Lyon: You may cross-examine.

(Conference between counsel.)

Mr. Leonard S. Lyon: First, I may have overlooked offering Exhibits 14 and 15. I would like to offer them under [156] their respective numbers.

The Court: Admitted.

(The photographs referred to were received in evidence and marked Plaintiff's Exhibits Nos. 14 and 15.)

(Testimony of Sydney F. Duncan.)

Mr. Harris: I don't find that Exhibits 7 or 8 have been offered.

Mr. Leonard S. Lyon: I think they have, but out of an abundance of caution I will ask that they be received in evidence.

The Court: 7 was admitted, I think, but 8 was not. In any event, they are now admitted in evidence.

Cross-Examination

By Mr. Harris:

Q. Mr. Duncan, how many different types of panel filters have you tested?

A. Why I suppose a dozen or so at various times in the past.

Q. Will you enumerate by manufacture's name and by type number the ones that you have tested?

A. Most of my test work has been on Farr manufactured filters. We have tested, as I said, the Air-Maze Type B. Since my experience with the test work extends over a considerable period of time other than the last two months I don't remember just all of the types. We tested a couple of types of the American Air Filter Company, but I don't remember the [157] precise type designations.

Q. Will you describe them generally for us, each of the other types that you have tested other than Air-Maze and Farr filters?

A. The American Air Filter was one of the type wherein a punched sheet forms the surface layer and various layers of screen and perhaps knitted or metal formed a layer in the filter.

(Testimony of Sydney F. Duncan.)

Another type of American filter which I don't believe carries a type number, omits the punched sheet at the front and uses several gradations of screen and the material known as Brillo, or a kind of knitted metal strip.

Mr. Leonard S. Lyon: May I ask if your question is limited to commercial filters or intended to include experimental models of other types which the witness himself may have made?

Mr. Harris: My question is limited to, first of all, excluding Air-Maze and Farr filters, and is limited to commercial panel type filters made by other manufacturers.

Now we have two American Air Filter Company filters. What others have you tested?

A. I have tested a filter made out of paper, the Detroit Air Filter Company.

Q. That is a commercial model that carries the patent number of the Kaiser patent, produced as prior art here?

A. I didn't examine the patent number on it.

Q. What other commercial panel type filters have you tested?

A. Well, we had a Burgess filter on test at one time but that one was not necessarily a panel type.

Q. Any others?

A. I think that about completes the list.

Q. Now were these tests that you have referred to, first the Detroit Air Filter and, second, the American Air Filter Company's filters, were those tests conducted in exactly the same fashion as the

(Testimony of Sydney F. Duncan.)

tests of the Farr and Air-Maze filters to which you testified on direct examination?

A. The American Air Filter, no, because it was tested some time ago and the test set was not constructed exactly the same way as it is now.

The Detroit Air Filter was tested in the test set in its present condition.

Q. So as to the American Air Filter Company's filters that you have tested, the results which you obtained earlier with the earlier test set could not be compared directly with any of the tests that you have made upon the present test set then, could they?

A. No, the results would be different if we re-ran the tests at the present time.

The Court: What was that answer?

The Witness: The result would be different if we [159] re-ran the tests at the present time.

The Court: With this machine?

The Witness: With this machine and this dust and automatic controls that we have, and so on.

The Court: When did you develop the machine? When was it finished?

The Witness: It was finished I think about a year ago or more, and then it was moved from one plant to another, so it was put again in operation the latter part of June in this new location.

By Mr. Harris:

Q. Is that this test setup that is illustrated in Plaintiff's Exhibit 8 of origin as recent as about a year ago?

A. Yes.

(Testimony of Sydney F. Duncan.)

Q. By the way, when was Exhibit 8 printed, Mr. Duncan?      A. Just recently.

The Court: The date is in the back.

The Witness: Within the last month.

The Court: It is on the last page.

Mr. Harris: 11-15-51 is noted on the last page.

Q. Is that correct?

A. That is the approximate date. [160]

\* \* \* \* \*

Q. Now with regard to the photographs, Plaintiff's Exhibit 9, would you point out on those photographs or any of them these drops of oil that you have referred to on your direct examination?

A. I think perhaps the ones most clearly visible are on 9-B, in the upper part of the filter. There are a few squares of screen where the crimped screen underneath touches the flat screen where there is a little reservoir of oil. I can point them out to you with the tip of my pencil, there (indicating), and there (indicating). There is one in here (indicating), and there are a few others scattered around. [162]

By Mr. Harris:

Q. There are number of those interstices in the wire mesh which are filled with oil, which are shown in that photograph, are there not?

A. At points where the crimped screen touches the fiat screen.

Q. Does that occur also in the Farr filter made in accordance with the '479 patent in suit, that the oil in some cases fills the perforations of the wire mesh?



(Testimony of Sydney F. Duncan.)

A. Not under normal operating conditions.

Q. Now, I think with regard to the photographs, Plaintiff's Exhibit 9, you stated that the air flow is from the bottom to the top of those photographs, is that correct, or that the air flow was from bottom to the top?        A. Yes.

Q. In the tests that you performed?

A. Yes.

Q. Now, it is true, is it not, that as so tested the construction illustrated in these photographs has a short leg of the herringbone passage on the upstream side and a long leg on the downstream side?

A. There is no attempt to make either leg longer or shorter than the other, as can be seen from an examination of the media, Exhibit No. 3. If they look different in the photograph, it is an accident of lighting or something else, [163] but the media was not—no attempt to make the two legs of the crimp different lengths.

Q. Well, regardless of the attempt, what is the fact, were they of different lengths or were they of the same length?

A. They were of the same length, as nearly as we can make them.

Q. Now, in the patent shown, the '479 patent in suit, it, however, shows crimps in which the legs of the herringbone are of different lengths, does it not?        A. In Fig. 3 they are so drawn.

Q. And they are so described in the specification, are they not?

(Testimony of Sydney F. Duncan.)

A. I believe they are. I can't point to the line, however.

Q. So that this sample filter which you tested for the purpose of these comparative tests illustrated by Plaintiff's Exhibit No. 9 was not made in accordance with the drawings of the patent, was it, or the specification?

A. My answer to that depends on my interpretation of the specifications, does it not?

Q. Well, you have just said——

A. I believe that it was drawn, that it is manufactured in accordance with the teachings of the '479 patent.

Q. It did not, however, have different length legs in [164] the corrugations, did it?

A. That is right.

Q. Now, that filter panel which was used in making the tests illustrated by the photographs, Plaintiff's Exhibit 9, was not a commercial sample of the Farr filter, was it?

A. It was made out of the same media and could have been used where the application was required. If you mean commercial sample, the frame was not precisely as we would make a seven-by-seven filter for someone who wanted a seven-by-seven filter.

Q. It was made specifically for the purpose of those tests?      A. That is right.

Q. And that, solely?      A. What?

Q. And solely for that purpose?      A. Yes.

The Court: And precisely the same as your commercial, insofar as the screen is concerned?

The Witness: Yes, sir.

(Testimony of Sydney F. Duncan.)

By Mr. Harris:

Q. Now, you stated, I think, in testing the small filter shown in Plaintiff's Exhibit 9, that heavier concentrations of dust were employed. Did I understand you to say that they were heavier than normal concentrations that would be [165] used in making filter panel tests?

A. Yes, that is right. We were feeding 10 grams of dust to this small-sized filter in, oh, 25, 35 minutes at a face velocity of the usual 519 feet per minute. We have had some experience in using the little test set versus the large test set and have found that the two tests produce almost the same efficiency characteristics. We used the small test set for an accelerated test, or, as I explained before, a high dust concentration test, to check the characteristics of our adhesive.

\* \* \* \* \*

Q. Now, with regard to the photographs, Plaintiff's Exhibit 9, is it true that some of those photographs—and I point out particularly Exhibit 9-F, which shows the enlargement of the flat screen with the deposition of dust thereon, in fact shows a very substantial accumulation of dust on the flat screen portion of the Farr type filter? A. Yes.

Q. In commercial practice, what percentage, roughly, of the total dust collected would be deposited upon the flat screen portions as compared with the rest of the panel?

A. Well, I haven't attempted to measure it and I would just have to guess.

(Testimony of Sydney F. Duncan.)

Q. As much as 30 per cent?

A. Well, I am not sure that it would be that high.

Q. You don't know that it wouldn't be that high, do you?

A. No. I don't know that it wouldn't be that high.

Q. I show you Plaintiff's Exhibit No. 11, Mr. Duncan. (Handing exhibit to witness.)

In the tests which you made and which are accumulated in this Exhibit No. 11, the fact was that the concentration of dust in the air passed through the Air-Maze Type B filter panel was very substantially higher than the concentration of dust in the air passed through the Farr filter panel, was it not?

A. That is right. The rate of the feed per hour was held constant and the amount of air was different, so that the concentration of dust fed to the Air-Maze was about a half again, doesn't it figure out? We have—well, I won't volunteer anything.

Q. Well, why did you not use the same concentration of dust in testing both panels. [167]

A. Because we have found over many, many tests, at various concentrations, particularly in comparison with the high concentration used in our small test duct and the somewhat lower concentration in the large test duct, that it has very small effect on efficiency provided we use a proper adhesive. The one we used on these tests was one which very rapidly soaks into the dust, so that the

(Testimony of Sydney F. Duncan.)

filter doesn't present a dry surface even though the dust concentration in the air is varied over limits of roughly two to one.

Q. What would have been the effect in general had you used the same dust concentration in testing both of these panels?

A. The curves would have come out to be almost exactly as shown on Exhibit 11.

Q. Now, this Exhibit 11 shows dust load on the filter in grams ranging from zero to 1,000. A 500-gram load on a filter panel of this type is considered a relatively high load, is it not?

A. 500 or 600 grams is usually considered to be a good, solid load.

The Court: Grams per what?

The Witness: Grams per 20-by-20 panel, grams per filter of this size, Exhibit 2.

The Court: You mean the grams that collect in the filter? [168]

The Witness: The grams that stick in the filter, yes, sir.

The Court: All right.

By Mr. Harris:

Q. And you know it to be a fact, do you not, that the usual recommendation of manufacture of filters of the panel type is that they should be cleaned when there is approximately a 500- or a 600-gram dust deposit in the filter?

A. Well, manufacturers have certain recommendations, I know.



(Testimony of Sydney F. Duncan.)

Q. What is the Farr Company's recommendation on that, on cleaning air filters?

A. At around 600 grams.

Q. And do you know what the recommendation of the Air-Maze Company is on the filter, upon the cleaning situation there, how often they should be cleaned?

A. No, I don't believe I do.

Q. So that if you look at this curve, Plaintiff's Exhibit 11, with a dust load of 500 grams, you would have almost exactly the same performance up to that point?

A. They would be pretty close.

Q. With the two filters tested?

A. Yes, their pressure drop and efficiency would be about the same. Their air-handling capacity would be different. [169]

Q. Also referring to Plaintiff's Exhibit 11, these curves, that shows a point on the test, so far as the Air-Maze Type B panel is concerned, of about .5 inch of water, that is correct, is it not?

A. Yes.

Q. And up to .5 inch of water is a satisfactory commercial pressure drop performance for a filter of this type, is it not?

A. The reason this test was stopped—well, no. I better answer your question directly.

So far as I know, a half-inch of water pressure drop doesn't seriously interfere with a ventilating system.

Q. In other words, what you mean by that is that in some conditions of installation, a half-inch of pressure drop would be perfectly satisfactory?

(Testimony of Sydney F. Duncan.)

A. Yes.

Q. In fact, in most?

A. Probably, yes, I think so.

Q. Now, if an operator or user wanted a high efficiency in dust removal and did not care about pressure drop through a filter panel, a filter panel such as the Air-Maze Type B would be preferable to him than the Farr filter panel, would it not?

A. Well, I don't know.

Q. What do you mean by that? [170]

A. To me it would not, perhaps because of its lower air-handling capacity. So that I find it difficult to project my thinking into someone's else's head as to what they might prefer.

Q. That might be the fact, however, might it not? A. He might arrive at that conclusion.

Q. You stated on direct examination that the Farr filter has about 50 per cent more capacity than the old Air-Maze, Plaintiff's Exhibit 5. Did you mean by that air flow capacity or dust-loading capacity? A. Air flow capacity.

The Court: The dust load capacity, I understood you to say, was about the same?

The Witness: The dust load capacity—in the old Air-Maze versus Farr filter, the dust-holding capacity of the Farr filter is somewhat greater, if you take some arbitrary point at which you determine what is dust-holding capacity.

By Mr. Harris:

Q. When you referred to increased filter capacity in the Farr filter relative to the old Air-Maze,

(Testimony of Sydney F. Duncan.)

Plaintiff's Exhibit 5, filter, you were referring again there to air-handling capacity?

A. Air-handling capacity, air flow capacity, the 800 versus the 1200 CFM. [171]

\* \* \* \* \*

Q. Well, perhaps we can get the record in the morning and read it back.

Now in regard to the old Air-Maze filter panel, Plaintiff's Exhibit 5, which has on the front face of it the expanded metal—excuse me. I guess you were referring to Exhibit 12, which has on it the expanded metal screening of the front and back.

A. Yes. If I spoke of expanded metal it was with respect to Exhibit 12, not Exhibit 5.

Q. You know as a fact, do you not, that actually under service conditions that expanded metal does collect a very substantial amount of dust?

A. Well, I haven't tested that particular expanded metal on that particular filter so how substantial the amount is I can't exactly testify. I know that it will collect dust.

Q. You haven't seen filters of that exact type after being tested, is that correct?

A. No. As a matter of fact, the filter I tested—if I may say so—did not have the expanded metal on the face of it because we tested our filter without any expanded metal on the face of it.

The Court: Did you put expanded metal on the face of yours?

The Witness: Yes, we put a material called Shelfex, [173] which is like the expanded metal on

(Testimony of Sydney F. Duncan.)

that, perhaps a little heavier. It has a little bigger hole and it is rolled out flat instead of being left with a little rough feeling, and we put that on the face of our filters for some applications.

By Mr. Harris:

Q. Have you ever tested any Farr filters made in accordance with the '479 patent in suit which did not have flat sheets between alternate layers of crimped sheets?

A. We had a partial test of such a filter without the flat sheets.

Q. How did you hold the sheets apart in that test?

A. We just turned the crimps around so that one sheet was crimped east and the other one crimped west, so to speak.

Q. As in the Air-Maze construction?

A. The same principle; yes.

Q. Referring back again to the tests which are accumulated in this Plaintiff's Exhibit 11, or rather the curves shown on it, what type oil did you use on those particular filters at the time they were tested?

A. It is an oil called Greenbloom 100. It is rather a heavy oil. It is a manufacturer's oil sold by the Standard Oil Company I think to manufacturers who can put their own additives in and market it under their own name.

Q. What is the approximate viscosity of that oil?      A. It is 100 seconds Saybolt. [174]

Q. Can you give me the approximate S.A.E. rating?      A. No, I don't think I can.

(Testimony of Sydney F. Duncan.)

Q. How about the tests that you made which accumulated in Plaintiff's Exhibit 13, what type of oil did you use in those tests?

A. Greenbloom 100.

The Court: The same oil?

The Witness: The same oil.

The Court: Is that what you use commercially?

The Witness: Yes, it is.

The Court: What is it, a very light oil?

The Witness: No, it is a rather heavy oil. It has a high flash point to meet fire specifications.

By Mr. Harris:

Q. Would it be more viscous than S.A.E. 30?

A. Yes, it is.

Q. Mr. Duncan, in the passage of air through a filter panel such as the Farr or Air-Maze 20-inch panel that is here in evidence, how does the pressure drop vary with the velocity of the airflow?

A. It varies approximately in the same fashion as the pressure drop varies through any orifice at various velocities.

Roughly, the rule is that the pressure drop goes up about the square of the velocity. If you double the [175] velocity the pressure drops about four times as much.

The Court: The pressure drops?

The Witness: Yes.

The Court: If you double the velocity——

The Witness: The pressure drop increases faster than the velocity by approximately the square of the velocity.



(Testimony of Sydney F. Duncan.)

By Mr. Harris:

Q. Referring to the photographs included in Exhibit 14, and particularly with regard to the photographs marked 14-A through 14-E, you said I think that you took each one of those in sequence and gave the filter panel a dust load, a run, as you call it, for a certain period of dust loading, and then took it out, separated it, and examined the wire mesh of the unit. Did you after each one of the runs separate the panel at the same place?

A. At the same place, as was done with the Farr filter in the same frame.

Q. That would disturb the dust deposit somewhat, would it not?

A. It would disturb the dust deposit somewhat at the places where the two layers of screen touch each other.

Q. Now referring to the photograph which is Exhibit 14-C, and particularly to the upstream side of the filter panel, the upstream face and the upstream end of the corrugations, that shows, does it not, 14-C, that the mesh of the [176] wire is not filled up with dust, it isn't plugged in that photograph, is it?

A. No. I don't see any holes that are plugged up tight.

Q. And the same thing is true as to the photograph 14-D, isn't it?

A. At the upstream face?

(Testimony of Sydney F. Duncan.)

Q. Yes.

A. As I examined the filters after each one of these runs myself I noticed that there were some of the holes that were plugged up, but they don't show particularly well in this picture.

Q. Most of them were not plugged?

A. I can't prove it by the picture.

Q. Most of them were not plugged, however?

A. That is right.

Q. So that at least through those first two runs illustrated by Exhibits 14-C and D——

A. May I correct you? That encompasses four.

Q. The first four runs?            A. Yes.

Q. There was little or no tendency for the air to be confined to any passages by a deposit of dust. In other words, the way was still open for the air to flow through the mesh of the screens? [177]

A. In a limited fashion; yes. [178]

\* \* \* \* \*

Mr. Harris: If the Court please, I have produced a sample of what purports to be an air filter labeled "Detroit Air Filter," which I ask be marked for identification as Defendants' Exhibit C.

The Court: Very well.

(The sample referred to was marked Defendants' Exhibit C for identification.)

Sydney F. Duncan, the witness on the stand at the time of adjournment, resumed the stand and testified further as follows:

(Testimony of Sydney F. Duncan.)

Cross-Examination (Continued)

By Mr. Harris:

Q. Mr. Duncan, I show you Defendants' Exhibit C for identification and ask you if that is a sample of the type of Detroit Air Filter which you testified yesterday that you had previously tested.

A. (Examining exhibit) It is the same type of filter.

Q. Perhaps not the same size?

A. No, nor is the spacing of the flat paper strips on both sides the same as the one I tested. [182]

The Court: Let me see it.

(The exhibit referred to was passed to the Court.)

By Mr. Harris:

Q. You know it to be a fact, do you not, that filters of that type as shown by Defendants' Exhibit C for identification have been in commercial use and on sale since at least 1932?

A. I have seen reference to them for a long time. I don't know whether it is '32 or not.

Q. Prior to 1937 at any rate? A. Yes.

Q. And it is a fact, is it not, that filters of that type are still widely sold and used commercially in the United States?

A. They are sold, as far as I know. How wide their distribution is, I don't know.

Q. Those filters are made in 20 by 20 panels, are they not? A. Yes.

(Testimony of Sydney F. Duncan.)

A. As well as smaller sizes. A. Yes. [183]

\* \* \* \* \*

Q. Are these filters of the type illustrated by Defendants' Exhibit C used under the same circumstances, the same conditions, as the Farr '479 patent filters that you have referred to?

A. If I understand you correctly, filters made by the Detroit Air Filter Company are applied in ventilating systems where Farr filters are also applied, and since they are made in approximately the same exterior dimensions they could be installed in the same hole in a frame.

Q. These filters as per Defendants' Exhibit C for identification are what we call in the industry "throw away" types, are they not? A. Yes.

Q. In other words, when an operator finds that his filter as per Exhibit C is clogged with dust he simply throws it away instead of cleaning, as is the case with the Farr filters?

A. Yes, they don't bother to clean them.

Q. First of all, as to Defendants' Exhibit C, that type of filter includes alternate crimped and uncrimped layers, does it not, or sheets?

A. Layers of paper; yes. [184]

Q. And those layers extend in the general direction of the flow of air through the filter, do they not? A. Yes. [185]

\* \* \* \* \*

By Mr. Harris:

Q. Would you explain the construction of Defendants' Exhibit C so far as the alternate layers are concerned, Mr. Duncan?

(Testimony of Sydney F. Duncan.)

A. It is a little difficult to see the construction in this particular sample because it is impossible to look through the edge of the paper around the outside. [186]

Mr. Leonard S. Lyon: I think the witness may have a model here that he can use in answer to the last question.

The Court: Do you?

The Witness: If I may produce one.

The Court: Yes, surely.

I see you have one of those "patented devices" here?

Mr. Harris: This is just a penknife; I am going to cut it so we can see what is inside.

The Witness: That is all right. I have one that is all cut up.

The Court: That will be marked No. 16.

(The device referred to was later marked Plaintiff's Exhibit No. 16 for identification.)

Mr. Harris: I don't seem to be able to cut this one either.

The Witness: With the two of them together, I think I can explain the matter.

Mr. Harris: For the record, I am going to cut, or attempt to cut, a hole in the top of Defendants' Exhibit C so we can find out what is inside of it.

The Court: Well, this Exhibit 16 has one size opening on one side and another size opening on the other, apparently.

The Witness: This was, however, an example of



(Testimony of Sydney F. Duncan.)

a standard Detroit air filter that is commercially produced at the present time. [187]

The Court: You secured that?

The Witness: Yes.

The Court: In the open market?

The Witness: In the open market.

By Mr. Harris:

Q. I have now cut two holes, a large one and a small one, in the sides of Defendants' Exhibit C. I show the witness again this exhibit. Directing your attention to the large hole at the edge, perhaps you can use that to point out to the Court what the construction of that is.

A. Defendants' Exhibit C is a filter made of paper in which there are two separate units assembled in one frame.

The units form the front and back faces of the filter. Each separate unit is made of alternate corrugated or crimped layers of paper and flat layers of paper, stuck together with an adhesive and stiffened by having small strips of wood placed along the back of the filter. These strips of wood are seen in Defendants' Exhibit C and Plaintiff's Exhibit No. 16 where the frame is cut away.

It is the function of these strips of wood to stiffen the panel and to a certain extent separate the two panels.

The Court: This one is different in size.

The Witness: Well, the difference between the two exhibits is that Exhibit C was manufactured in its present size by the Detroit Air Filter;

(Testimony of Sydney F. Duncan.)

whereas, Exhibit 16 is a [188] section cut out of a 20 by 20 panel and assembled this way for purposes of demonstration.

By Mr. Harris:

A. And in the model, Defendants' Exhibit C, do the alternate crimped and uncrimped layers extend in a direction generally parallel to the stream of air flow through the filter?

A. Yes, they do. [189]

\* \* \* \* \*

Q. If Defendants' Exhibit C, made with the alternate crimped and uncrimped cardboard layers, were made out of screen wire instead of cardboard, would such a filter work in substantially the same way to produce the same result? By that I mean removal of dust from air passing through it, as the filter panel shown and described in the '479 patent in suit.

Mr. Leonard S. Lyon: The same objection.

The Court: Objection overruled.

Do you understand the question?

The Witness: I believe so.

The Court: All right.

The Witness: A two-unit device with stiffeners down the back, in every way the same as the Detroit air filter, but [190] with the simple substitution of screen for paper, would act as an air filter. Now, then, that is neither physically like nor the same as the Farr filter. There are two units in this frame, and there are not two units in the Farr filter, as shown by Plaintiff's Exhibit No. 3. But

(Testimony of Sydney F. Duncan.)

it certainly would act as an air filter if it were made of screen and oiled.

The Court: How would the efficiency rating and pressure loss compare?

The Witness: I don't know, Your Honor.

The Court: How does this (indicating) compare? Have you tested this for pressure loss and efficiency rating?

The Witness: I tested one that is not exactly like Exhibit C, because Exhibit C has rather large crimps on both sides, whereas Exhibit 16 has I think three layers to the inch on one side of the filter and five layers to the inch on the other side.

The Court: You have tested this one?

The Witness: This one has been tested, yes.

The Court: Or you didn't want to ask him that question?

Mr. Harris: Oh, I don't care. I would just as soon ask him.

Q. As a matter of fact, in that Detroit air filter that you tested you found that there was a very low pressure drop during the period of test, did you not?

A. I have to refresh my memory and look at the curve. [191]

In the test I ran on a Detroit filter in a 20 by 20 panel, at 519 feet per minute, or 1200 CFM, through the 20 x 20 panel, the pressure drop was varied from 23/100 of an inch to approximately 28/100 of an inch over a dust collection by the filter of some 250 grams. The efficiency of the filter over

(Testimony of Sydney F. Duncan.)

the same series of test runs varied from approximately 65 per cent up to about 73 per cent. This filter was tested in the large test set described previously, with the conditions of dust feed, air velocity and temperature, and so on, the same as for the tests shown on Plaintiff's Exhibit No. 13. [192]

The Court: And used the same material?

The Witness: The same dust.

The Court: The same dust.

The Witness: The difference—I think I said that all of the other filters were tested with this Greenbloom 100 oil. The Detroit filter paper comes already provided with its adhesive so the adhesive is the one thing that is different in the test. It has its own adhesive on it.

By Mr. Harris:

Q. And the higher initial pressure drop for the Detroit air filter in that test was higher than the Farr filter?           A. Over twice as high.

Q. And that higher starting pressure drop was due to the fact that in the Detroit air filter the air could not flow through the walls of the alternate crimped and uncrimped layers?

A. That probably contributed to it.

The Court: What is the difference between Pocahontas fly ash, 80 per cent and 20 per cent lampblack? What is the difference between that and the dust you used?

The Witness: Quite a lot. I believe you are looking——

(Testimony of Sydney F. Duncan.)

The Court: At Exhibit No. 4.

The Witness: The P-5 catalog.

The Court: Where they say their filters were tested [193] with this combination.

The Witness: There is no particle size analysis given of this dust. I believe the specification is that it shall pass a 100-mesh sieve, which doesn't give me enough information to tell exactly what the difference is between this dust and the dust we are using.

The Court: Very well.

By Mr. Harris:

Q. There is another very common dust which is used for testing purposes which is indorsed by the Bureau of Standards, is there not?

A. Yes. They use a material they call Cotrell Precipitate.

Q. And that is 96 per cent Cotrell Precipitate and about 4 per cent lint, isn't it?

A. I don't think they use the lint at all. Sometimes they do and sometimes they don't.

Q. Have you made any tests of the Farr '479 type filter using a dust including lint?

A. Not recently in the presently designed test set.

Q. The fact is, however, that if you use such a dust, including a fair supply of lint, that the pressure drop will rise much higher than you have indicated by your curves in evidence, Exhibits 11 and 13? A. Not necessarily. [194]

Q. Two or three times as high, wouldn't it?



(Testimony of Sydney F. Duncan.)

A. As I said, I haven't tested it recently. Just my opinion is that it will not increase the pressure drop seriously unless you have—well, for instance, if you throw a pillow full of feathers at it why the pressure drop will probably go up to whatever the fan can do. It will close off the whole thing. A pillow full of feathers won't do anybody's filter any good.

On the other hand, if there is a small amount of lint in the air, we have found that it doesn't seriously change our pressure drop characteristic curve.

Q. What do you mean by "a small amount"? Do you mean in the air used under service conditions or in your tests in your laboratory, which do you mean?

A. Well, since I haven't tested with lint I am relying now on observations of filters operating in linty areas.

For instance, I seem to remember that we had a filter installation intake on one side of an alley opposite the exhaust from a hat works, or something, on the other side of the alley, where it just happened that a lot of lint from reconditioning hats, men's hats, came across and deposited on the filter.

We found the operation of that filter to be quite satisfactory if it were cleaned a little oftener of the lint matter that formed on the face of it. The lint could be cleaned off [195] of the filter quite easily.

Q. You mean in that filter the pressure drop through the filter increased more rapidly than it did under perhaps other service conditions?

(Testimony of Sydney F. Duncan.)

A. Yes, that is true.

Q. And increased to a great extent, did it not?

A. It would be true of any filter operating under lint conditions, in my opinion.

Q. The fact of the matter is, in the Los Angeles area there is considerable lint in the atmosphere around outside?

\* \* \* \* \*

The Witness: There is some lint in the atmosphere. It varies from area to area depending upon activity. I don't know precisely how much. [196]  
By Mr. Harris:

Q. And there was no lint in the dust that you used in making the tests accumulated in Plaintiff's Exhibits 11 and 13, was there?

A. No, there was no lint in the dust.

Q. Referring you to the Farr catalog, which is Plaintiff's Exhibit 7, that catalog shows—you have one, have you? A. Yes.

Q. That catalog shows a number of what appear to be different types of filter units—and I refer you to the back page of the catalog—are those units all made in accordance with the teachings and disclosures of the '479 patent in suit?

A. You are talking about the filters on the back page?

Q. Yes. A. The back of the catalog?

Q. Yes.

A. Well, one of these units is not a filter unit. It is a washing apparatus.

Q. Which one is that, Mr. Duncan?

(Testimony of Sydney F. Duncan.)

A. That is the second picture from the top on the right-hand side.

Q. On the left, do you mean, don't you?

A. On the right-hand side of the page, right there. [197] (indicating) It is the second picture from the top, and it is a washing and oiling device, so that that picture hasn't anything to do with the filter. Anybody's filter could get into this thing.

On the left-hand side, the second picture from the top, the caption reads "Far-Air Rotary Coolers," so that device is not designed as an air filter of the panel type.

The other pictures illustrate air filters and they are made of the same media as shown in Plaintiff's Exhibit 3—where is Exhibit 3?

(The exhibit referred to was passed to the witness.)

By Mr. Harris:

Q. All of the other types you would classify as filter panels, would you?

A. Well, there are round panels and rectangular panels. We make that distinction among ourselves at least, but panel type filters to most people means a rectangular panel.

Q. Would you say that a round filter was not a filter panel?

Mr. Leonard S. Lyon: I object to that. He has already answered that.

The Court: A round what?

Mr. Harris: A round panel is not a filter panel.

The Court: What is the difference?

(Testimony of Sydney F. Duncan.)

Mr. Harris: I want to know what this witness means [198] when he says that is a filter panel.

The Witness: I have said round panels and rectangular panels, but that usually when we speak of panel filters people envision the rectangular one rather than the round one, that is all.

By Mr. Harris:

Q. They may be either round or rectangular?

A. I have no objection to their shape.

Mr. Harris: I produce a sample of one of the round Farr filters which counsel has kindly provided to us and ask that it be marked for identification as Defendants' Exhibit D.

(The device referred to was marked Defendants' Exhibit D for identification. )

By Mr. Harris:

Q. Showing you Defendants' Exhibit D for identification, Mr. Duncan, that is a filter of the type illustrated in the lower right-hand corner of the catalog, Plaintiff's Exhibit 7, is it not?

A. Yes.

Q. Now the plaintiff Farr Company also makes filter panels having the same type of media as the rectangular Farr panels in evidence here, which are four inches thick, do they not?      A. Yes.

Q. Do you have any performance curves on the 4-inch-thick [199] Farr panels?

A. No, I don't have any curves with me.

Q. You know as a fact, however, that in the 4-inch-thick panels the pressure drop is considerably higher than in the 2-inch-thick panels?

(Testimony of Sydney F. Duncan.)

A. Just about twice since it is twice as thick.

Q. And the increase in pressure drop is commensurately greater, is it not, between the 4-inch and the 2-inch?

A. The general slope of the curve would be about the same. The percentage increase would be the same for the 4-inch and the 2-inch.

Mr. Harris: I produce a further Farr catalog entitled "Far-Air Filters" and identified as Bulletin B-100-1, which I ask be marked for identification as Defendants' Exhibit E.

(The catalog referred to was marked Defendants' Exhibit E for identification.)

By Mr. Harris:

Q. Showing you Defendants' Exhibit E, Mr. Duncan, do you recognize that as an earlier form of catalog put out by the Farr Company, the plaintiff here, showing their various filter panel products? A. Yes.

Mr. Harris: I think this is helpful, if the Court please, because it shows perhaps a little more clearly than the catalog Exhibit 7 some of the plaintiff's products. [200]

The Court: This bears a printing date 1946 on it. I notice that Exhibit No. 7 has a printing date 9-1-51 on it.

Go ahead.

Mr. Leonard S. Lyon: This last exhibit is Bulletin B-100-1 and I notice the Exhibit 7 is Bulletin B-100-2.

The Court: Yes.



(Testimony of Sydney F. Duncan.)

By Mr. Harris:

Q. The products illustrated in this last catalog, Defendants' Exhibit E, have all been made and sold by the Farr Company, have they not?

A. I think so. I don't have the exhibit here, but if we have a picture of it in there we made it once.

Q. On pages 2 and 3 of that catalog, Defendants' Exhibit E, are shown a number of types of filter panels, is that correct?      A. Yes.

Q. And those have all been made by the Farr Company, have they not?      A. Yes.

Q. Now on the back of that catalog is a small illustration in the lower left-hand corner on the left side of the page——

A. Under the wording "progressive loading"?

Q. Yes.

That illustrates the operation of the filter panels made [201] in accordance with the '479 patent in suit, doesn't it?      A. Yes, sir.

Q. Now would you explain with reference to that little illustration what this progressive loading is? I think the illustration is quite clear.

A. The illustration shows four red lines labeled 1, 2, 3 and 4, and captioned "Air Flow."

Line No. 1—well, all of these lines are a little wiggly, but line No. 1 is quite straight and is shown going through the filter in such a manner that it would have to pass through the meshes of the screen of the sheet of crimped screen.

Line No. 2 is shown deflected down one of the passages formed by the sheet of crimped screen and

(Testimony of Sydney F. Duncan.)

the dirt on the side of that passage is indicated by the black, heavy black, area.

Line No. 3 is still further deflected down the passage.

Line No. 4 is deflected down the passage until it comes to the change in direction and then follows the new change in direction until finally it indicates that the air has reached a place where there are unclogged screen meshes and then it flows through the mesh of the screen again.

This action is I think about the same as is shown in Plaintiff's Exhibit 9.

Q. When the filter is cleaned then the general direction [202] of air flowing through the filter is straight through in a plane perpendicular or normal to the face of the filter, is it not?

A. As I have said before, the flow takes place partly down the passages and partly through the mesh of the screen.

There is no aerodynamic principle that requires that the air follow its path alone.

Q. When the filter is clean, how far down the passages does it go before going through the mesh?

A. Some of it may go a little ways, and some of it goes right through a mesh to begin with. I don't know.

The Court: Is there a turbulence created in the air in the filter?

The Witness: Yes, there is turbulence created by the fact that the walls of the passages are, in effect, rough because of the wires that interrupt

(Testimony of Sydney F. Duncan.)

their surface and turbulence is caused by air flowing through the mesh of the screen from one passage to another and interrupting the flow in adjacent passages. This would be an interchange type of flow causing turbulence.

By Mr. Harris:

Q. Referring to the series of photographs included in Plaintiff's Exhibits 9 and 14, which I show you, can you say that those photographs in those two exhibits show that the Air-Maze P-5 filter loads more uniformly throughout its [203] thickness than does the Farr filter of the '479 patent?

A. If photographs 14-D and 9-D are compared, it appears——

The Court: That is after 70?

The Witness: Yes. One is after 40 grams and the other is after 70 grams, but the appearance of the pictures is what I wish to call attention to.

The Court: Which one is after—40 grams, you say?

The Witness: 14-D is labeled after 4 runs, one run with 10 grams in each case.

The Court: Then Exhibit 9-C would be the corresponding picture on the Farr filter, would it not?

The Witness: Yes. I will compare those if you wish.

Comparing No. 14-D and 9-C, it appears that in 14-D a dust has deposited on the upstream face of the filter down through the first section of the so-called Z crimp, is deposited in the center of the section of the Z crimp and in a few places is

(Testimony of Sydney F. Duncan.)

depositing on the downstream or lower face of the filter in 14-D.

This action is not demonstrated in 9-C where the dirt load is toward the upstream face of the filter. By Mr. Harris:

Q. So that the distribution of dirt load is more uniform throughout the depth of the Air-Maze filter than it is in the Farr filter? [204]

A. I would say it is more uniform.

The Court: At that stage.

The Witness: There is a gradation of intensity of dust load, but it is distributed through more of the filter than on the Farr filter.

The Court: Is that true after 9 loading runs, 9-E?

The Witness: Well, if we wish to compare the same amount of dust fed to the filter then 14-E—well, there isn't any exactly corresponding picture to 14-E, which was the last picture taken after 50 grams.

The Court: Is there one that corresponds to 9-E?

The Witness: No, there is none. The test was discontinued after the P-5 media had been loaded pretty well all through the filter as shown in 14-E.

The Court: What is that after 7 runs?

The Witness: In 14-E, that is this one, that is after 5 runs, or 50 grams had been fed to the filter.

The Court: You do not have any corresponding——

(Testimony of Sydney F. Duncan.)

The Witness: I don't have a 50-gram picture of the Farr filter. I have a 40-gram and a 70-gram and a 90-gram picture.

The Court: What is the largest gram picture you have of the P-5 filter?

The Witness: 14-E, 50 grams. And the dust is distributed well through the filter all the way through. [205]

The Court: How does that compare with 9-E?

The Witness: 9-E, after 90 grams the dust is heavily loaded toward the face of the filter and the downstream half of the filter, one might estimate, is perhaps half loaded, or something like that.

The Court: Very well. Proceed. [206]

By Mr. Harris:

Q. Why didn't you make any 70-gram run on the Air-Maze P-5 filter tested?

A. Because of the dust distribution throughout the filter. The pictures had shown——

The Court: You mean the pressure drop?

The Witness: No. This was not a pressure drop proposition.

The Court: All right.

The Witness: It was to show where the dust was in the filter, and a further loading of this filter and taking of photographs would probably not have shown much distinction, although it would have probably caught some more dirt.

By Mr. Harris:

Q. The same reasoning applies as to why you did not make a 90-gram test on the Air-Maze filter tested, does it not?



(Testimony of Sydney F. Duncan.)

A. I thought that was what I was talking about. I must have misunderstood your question.

Q. I asked first as to why you did not make a 70-gram test on the Air-Maze filter, and now I want to know why you did not make a 90.

A. For the same reason.

Q. I note that in these photographs that are the Exhibit 9 photographs, the dust on the Farr filter is very dark in color, whereas in the Exhibit 14 photographs the dust is very [207] light, almost white in color. To what do you attribute that, Mr. Duncan?

A. The difference in lighting. The same dust was used, the same oil was used, they were treated the same, as nearly as we could, prior to running the test. But the dust did look lighter on this filter, on the P-5, than it did on the Farr filter.

Q. On Exhibit 14 I think, just so the record will be clear, you ought to mark with a pen the direction of air flow.

Mr. Leonard S. Lyon: You better have the exhibit itself, or do you have it?

The Court: I think he has it.

The Witness: I have the exhibit. I can do that.  
By Mr. Harris:

Q. I suggest that you simply mark an arrow on that exhibit, perhaps on the margin, to illustrate the direction of flow.

(The witness complies with the request of Mr. Harris.)

(Testimony of Sydney F. Duncan.)

Mr. Harris: And on one of the lower margins of the sheet you have marked an arrow with the words "Air flow," have you not?

The Witness: I have. [208]

\* \* \* \* \*

Q. Referring to Plaintiff's Exhibit No. 7, the Farr catalog, which is before you, and particularly on the back sheet thereof to the unit illustrated in the lower left-hand, entitled, "Far-Air Kitchen Grease Eliminators," that is comprised of two standard Farr air filters set at an angle to each other, is it?      A. Yes.

Q. As also are illustrated in the '479 patent?

A. Yes.

Mr. Leonard S. Lyon: You mean by that the filter media?

Mr. Harris: The filter media is the same as in the '479 [209] patent. They are referred to there in the catalog as "Grease Eliminators."

Q. What is the function of those units, to take grease out of air?

A. To take the droplets of grease that spatter up off of a hotel kitchen range or something of that sort.

Q. Are those droplets in a solid state or are they in a liquid state?

A. They are in a liquid state, I suppose.

Q. Referring to the device illustrated on the back of Plaintiff's Exhibit No. 7 on the right-hand side, second from the bottom, which is identified as a "Far-Air Type EC-2," that is a unit adapted

(Testimony of Sydney F. Duncan.)

to be placed on the carburetor of an internal-combustion engine, is it?

A. I suppose we could use them, but ordinarily we do not. They are for air compressor intakes. We could use them on carburetor intakes on small-size engines.

Q. Mr. Duncan, do you have in front of you copies of the graphs, Exhibits 11 and 13?

A. I have a copy of No. 13 here, but No. 11 seems to have escaped me for the moment.

Q. Very well. I shall hand you the Court copy of No. 11. (Handing Exhibit No. 11 to the witness.)

Did you draw these curves yourself?

A. Yes, sir. [210]

\* \* \* \* \*

The Court: About how long would this Detroit filter last before it would be thrown away? Well, the low pressure drop, I understand that determines the period.

The Witness: I think it is very difficult to answer a question of how long a filter will last.

The Court: Well, how long before it builds up under test conditions?

The Witness: Well, under test conditions, it is an exaggerated situation so we can get it tested within a reasonable period of time. At 20 grams an hour and at a thousand grams we would get 50 hours of testing to produce that curve, divided by, say, approximately 75 per cent, and you have about 75 hours of test to produce that curve.

The Court: Oh, you have the Exhibit 13 now?

(Testimony of Sydney F. Duncan.)

The Witness: Or Exhibit 11.

The Court: I mean, you don't have a curve on this, do you?

The Witness: I read some data, and the time it took to accumulate that data where the pressure rose from about 23/100 of an inch to about 28/100 of an inch. That was 250 or '60 grams, I think I said.

The Court: Yes.

The Witness: So that would be of the order of five hours.

The purpose of that particular test was to determine its initial or starting conditions, and we did not run a load test [215] on it.

The Court: You did not test it to see how long the pressure drop built up to where its efficiency was destroyed?

The Witness: Well, because of the nature of the adhesive on the Detroit air filter, which is rather thick grease material, which you can feel on Exhibit C, the grease doesn't soak through the dust very fast, so that in an accelerated test the filter fails earlier than a filter on which you can put stuff like this Greenbloom 100, which is a very thick oil something like S.A.E. 60 or something like that.

So, with this filter, from an examination of its surface and looking into the passages, its surface was getting dry at the end of this test and we discontinued the test because we had determined the initial conditions.

The Court: In other words, if the surface was

(Testimony of Sydney F. Duncan.)

dry, then the particles would not stick?

The Witness: The efficiency would have shortly started to drop off.

The Court: Well, on that type of filter, they take them out and throw them away because they get dry or because they get filled with dust?

The Witness: Well, with passages as large as they are in Exhibits C and 16, ordinary dust would probably not plug these passages as such, but when the filter is thrown away, it depends on who is using the filter and not on the [216] manufacturer.

The Court: It depends on the use of the filter?

The Witness: It depends upon the feelings of the user. A filter like ours—The Detroit air filter is sold to the individual householder among others, to put in his forced-draft heating system. Now, whether the individual householder throws it away in time or too early or never throws it away depends upon him and not upon the manufacturer.

The Court: What is the comparative cost to the customer of the 20 by 20 Detroit filter and the Farr 20 by 20 or an Air-Maze 20 by 20?

The Witness: It is of the order that is thrown away. Filters of this and several other types run around, I think, \$1.25 or so.

The Court: For a 20 by 20 panel?

The Witness: For a 20 by 20 panel. And they probably should be thrown away about once a heating season and start the heating season with a clean filter.



(Testimony of Sydney F. Duncan.)

On the Farr filter, I am not in the sales department, so I don't know what we sell them for, but it is seven or eight dollars, but they have got it for 10 or 15 years if they treat it well.

This one (indicating) costs a dollar to two dollars a year, and the other one maybe costs 50 cents a year.

By Mr. Harris: [217]

Q. Can't we clarify this, Mr. Duncan, by saying that the user should use any of these filters, whether they are the Farr, the Air-Maze filter P-5 in suit, or the old Model B Air-Maze, or the Detroit air filter, until the dust holding or collecting capacity begins to drop off very fast, at which time the filter of the throw-away type should be thrown away, or if it is a wire type, it should be cleaned? That is the actual fact of the matter, is it not?

A. The user should use the filters until they have either exceeded some pressure drop or dropped below some efficiency. You said "dust-holding capacity" drops off, and we have been referring to efficiency or pressure drop, and dust-holding capacity isn't exactly the statement that I would have used there.

Mr. Harris: I should have said "efficiency."

The Court: Well, a filter is subject to the additional infirmity of drying out and not collecting any dust, regardless of how much dirt is collected in it to reduce the pressure drop?

The Witness: No. The dust dries it out.

The Court: The dust dries it out?

(Testimony of Sydney F. Duncan.)

The Witness: The dust dries it out. This adhesive, so far as I have been able to observe, doesn't seem to just dry out before——

The Court: It dries from the heat of the air?

The Witness: It is pretty sticky stuff, not vase-line. [218]

(Short recess.)

The Court: Proceed.

By Mr. Harris:

Q. Mr. Duncan, Plaintiff's Exhibit 2 is a Farr air filter type 44. It has the 14 mesh wire in it, does it not?           A. Yes.

Q. And the Farr Company also makes a similar filter referred to by them as a model 88, does it not?

A. 88? I don't remember an 88. We have a 68.

Q. Well, another model which has 18 mesh wire instead of 14 mesh wire?           A. Yes.

Q. And in tests of that model with the 18 mesh wire, the filtering efficiency is higher and the pressure drop is also higher, is it not, than in this 44 model?

A. Yes, a little bit. But it has the same characteristic flat pressure curve, and so on.

Q. Now when these filters, such as the Farr filters, Plaintiff's Exhibit 2, are used in the field the dust concentration in the air passing through the filters is very much less than in the laboratory tests that we use to make the curves, Exhibits 11 and 13. That is true, is it not?           A. Yes.

(Testimony of Sydney F. Duncan.)

Q. And the dust accumulation in those filters is over a long period of time before the filter efficiency starts to drop off? I mean a relatively longer period of time. [219]

A. Well, if you mean just handling ordinary atmospheric air.

Q. Yes.

A. There are of course applications where the dust concentrations are higher than in the test set.

The Court: As, for instance?

The Witness: A tobacco processing plant has an application where we have suggested that the filter be cleaned every four hours. They have a very dusty area. I don't know why, but there is one case like that:

Then there are railroads where they draw air from close to the track, and they are cleaned at more frequent intervals.

The Court: This tobacco plant, what do they do, put the dust back in the cigarettes?

The Witness: Well, I didn't inquire into that, but that was just about the kind of stuff we were asked to take out of the air.

By Mr. Harris:

Q. Now in ordinary field service where a filter might run, say, 30 days before having to be cleaned or requiring cleaning, in that case the dust accumulation is slow and that slow accumulation of the dust gives an opportunity for the oil, with which the filter is initially coated, to soak through the dust and present continuously a wet oily surface, [220] does it not?

(Testimony of Sydney F. Duncan.)

A. That is the function of the adhesive.

Q. In other words, in a long period of service like that in the field the oil soaks through the dust as the dust is accumulating and continually presents a fresh oiled or oily surface upon which the dust particles may impinge?

A. That is the intention; yes.

Q. And that is true even in the Detroit air filter which is in evidence, or which is marked for identification as Defendants' Exhibit C, is it not, that the same thing takes place in the field?

The Court: It is in evidence. Exhibit C is in evidence.

The Witness: To a different degree, but it is the same type of action as far as the adhesive is concerned [222]

\* \* \* \* \*

The Court: Is there not any precipitation that they use in smokestacks?

Mr. Leonard S. Lyon: That is electrical precipitation.

The Court: They use electricity in precipitating the dust.

The Witness: They charge the particles and collect them on plates. But they have to be particles, not gases.

The Court: They have to be particles?

The Witness: Yes.

The Court: In other words, that is not used in the ordinary commercial installation?

The Witness: In some of them, yes.

(Testimony of Sydney F. Duncan.)

The Court: I mean, for instance, like these up here in this room, they would not use an electrical filter there to precipitate it, would they?

The Witness: Many of them have been installed in building ventilating systems.

The Court: They have?

The Witness: Yes.

The Court: And do they require cleaning or are they a solid plate or is it a wire plate?

The Witness: Well, it is generally a series of solid plates next to each other and they do have to be cleaned periodically.

The Court: They do not use screen wire? [223]

The Witness: There is one type that has some slightly roughened surface, I think.

By Mr. Harris:

Q. Referring, Mr. Duncan, to Plaintiff's Exhibit 5, which is the Air-Maze type B filter panel, you have testified I think that the downstream side has a number of layers of alternately crimped and uncrimped mesh members, have you not?

A. Yes.

Q. And those members subdivide the edge of the panel in two dimensions, do they not?

A. Yes.

The Court: That is the Air-Maze?

Mr. Harris: This is the Air-Maze type B.

The Witness: Yes, it is the edge of the panel which is normally covered by sheet metal that is subdivided in two dimensions. [224]

\* \* \* \* \*



(Testimony of Sydney F. Duncan.)

Mr. Harris: Before we go into the patent in suit, I produce here a Farr bulletin numbered Bulletin A-100-4, which I ask be marked for identification of Defendants' Exhibit F.

The Court: That is a Farr bulletin?

Mr. Harris: Farr bulletin, your Honor, No. A-100-4.

(The bulletin referred to was marked Defendant's Exhibit F for identification.)

By Mr. Harris:

Q. I show this to the witness——

Mr. Leonard S. Lyon: He has one.

You might hand that to the court and he can use this one.

By Mr. Harris:

Q. Does this bulletin, Defendant's Exhibit F, illustrate various manners in which the Farr filters of the 44 type may be and are installed commercially? A. Yes.

Q. I note on the first page of that little bulletin, the second view about the center of the page from the left, second view from the left, is entitled "V-bank." That is one method of installation in an air duct?

A. Of filters in general, yes. [225]

Q. Of the Farr type filters involved in this suit?

A. Yes, we could install them that way.

Q. And they are installed that way, aren't they?

A. I suppose so. I don't remember seeing one just like this.

(Testimony of Sydney F. Duncan.)

Q. And looking at the back of that bulletin there again are a series of diagrams toward the lower portion of the page, one of which is entitled "Slanted Filter." A. Yes.

Q. Which shows a filter panel, does it not, which is set at a very acute angle to the axis of the duct?

A. Yes.

Q. In that the normal direction of the air flow would be at an acute angle with relation to the face of the filter panel, would it not?

A. Well, the panel is at an angle to the duct, but the air flow is actually changed considerably by the installation of the filter panel.

The Court: Do you have a copy of that?

(The exhibit referred to was passed to the court.)

By Mr. Harris:

Q. Then also on the back of that little pamphlet, the second view from the right, entitled "Double Slanted Filters," it shows two of these filter panels set at a V-angle in the duct, does it not? [226]

A. It shows two filter panels set that way; yes.

Q. And the Farr filters, to your knowledge, are installed as shown in these two figures to which we have had reference on the back of this pamphlet?

A. We have used the slanted filter in aircraft installations, and I don't know whether we have used the double slanted deal or not, but there is nothing to prevent our using it where it applies.

(Testimony of Sydney F. Duncan.)

Q. Well, now, in either of those forms, either of those applications, first of all the direction of air-flow through the duct is along the length of the duct, is it not?

A. Provided there aren't changes in direction or obstructions or something. [227]

By Mr. Harris:

Q. And what is the direction of air flow relative to the face of the filter panel where the air flow strikes the filter panel?

A. It probably makes some kind of an angle at the face of the filter panel.

Q. It would be at an acute angle, would it not?

A. Not necessarily.

Q. The air would be striking the filter panel face in a very acute angle, would it not?

A. Not necessarily. If there were a single jet of air in an otherwise still body of air, then I would say it could be directed at an acute angle to the face of the filter, but where the filter occupies the entire cross-section of the air flow passage, whether it be at an angle or abnormal to the air flow passage, this changes the flow of air ahead of the filter and after the filter. So you can't say, without going into some rather delicate test procedure, just exactly at what angle the air flow meets with the face of the filter, either a half-inch out from the face of the filter or a quarter-inch out from the face of the filter.

Q. Now, will you refer again to the patent in suit, the '479 patent in suit, which is Plaintiff's Exhibit 1. Now, you have stated, I think, that the

(Testimony of Sydney F. Duncan.)

panel as shown in that patent is subdivided by the crimped and uncrimped [228] sheets in both dimensions. Did you so testify?

A. I think I said that the panel was subdivided in both dimensions to the face of the panel by the crimped sheets. I don't remember my wording exactly, but whether I said the crimped and uncrimped sheets, I think I left out the "flat sheets" in that statement.

Q. Do you say that the filter panel illustrated in the '479 patent is divided in both dimensions by the wire sheets upon the panel bed? A. Yes.

Q. And both the flat and the crimped sheets contribute to that subdivision, do they?

A. Well, the flat sheets cannot contribute to the sub-division in the dimension parallel to the direction in which they run.

Q. What are these dimensions that you are speaking of?

A. The dimensions that I speak of are the usually accepted engineering method of describing a space or an area. We speak of one-dimension flow or one-dimension motion, or a force in one dimension, when we designate a single line and the distance along that line.

We speak of motion in two dimensions where we mean motion that would take place in a plane, a flat surface, and it might go, for instance, up at the same time that it was going to the right or to the left. [229]

(Testimony of Sydney F. Duncan.)

The dimensions are generally understood to be directions at 90 degrees to each other, so that when we speak of three-dimensional motion or space, or a three-dimensional force system—it applies to all of these things—we mean a motion or a space or a force system in which it takes the three axis mutually at right angles to each other to describe a distance or a location or a direction or something.

Q. Boiled down, Mr. Duncan, it is the length and breadth of the face of the filter panel?

A. These two dimensions, while they are understood to be a 90 degrees to each other, I haven't specified any particular orientation to the face of the panel.

Q. So they could be oriented in any direction?

A. They could be. One of them could be one diagonal, and the other another diagonal of the square.

Q. In other words, if we took the '479 patent drawing and held it at a 45-degree angle, the face of the filter panel would still be divided vertically and horizontally?

A. It would be multiply subdivided in both dimensions of the face of the panel, yes.

Q. Now, do you find anything in the specification of the '479 patent that would indicate what such both dimensions are?

The Court: What the dimensions are?

Mr. Harris: Both dimensions that he is talking about. [230]

The Witness: I don't remember any definition



(Testimony of Sydney F. Duncan.)

such as I have just given you about "both dimensions."

The Court: There are only two dimensions there, aren't there?

Mr. Harris: Well, I am trying to find out what these dimensions mean, your Honor. That is going to be a question you will have to decide.

The Court: What "dimensions" mean?

Mr. Harris: Yes.

The Court: What what dimensions mean?

Mr. Harris: Well, the claims specify "both dimensions" and we have to determine what that means.

The Court: All right.

The Witness: Well, it says something about both dimensions perpendicular or in a plane perpendicular to the generally intended direction of air flow or the intended direction of the flow of the medium to be filtered, I think.

Mr. Leonard S. Lyon: You don't have to remember this patent by heart.

The Witness: No.

The Court: It says, "arranged so as to effect a multiple subdivision of the panel in both dimensions perpendicular to the general direction of flow of the medium to be filtered." "Both dimensions."

Have you got the patent there? [231]

The Witness: Yes.

The Court: I was reading claim 4.

The Witness: Yes.

The Court: Is that what you are talking about?

(Testimony of Sydney F. Duncan.)

Mr. Harris: Yes, that is exactly what we are talking about.

The Court: What you want to know is what is meant by that language, "both dimensions perpendicular to the general direction of flow"?

Mr. Harris: Exactly, your Honor.

The Witness: Shall I go ahead?

The Court: How could both dimensions be perpendicular?

The Witness: As my three fingers are now, approximately perpendicular to each other, a three co-ordinate system as might be described by the two adjacent edges of a bridge table and the leg of the bridge table at that corner, there are three lines——

The Court: I don't play bridge.

The Witness: Poker tables are round and I don't know whether you play poker or not.

We can use a book for demonstration, one at the lower edge of the cover of the book, with it normally right side up, the vertical edge of the cover of the book, and a line going down the corner of the pages constitute the axis of a three-dimensional system as it is understood in mathematics and in [232] engineering. These dimensions are at 90 degrees to each other.

The Court: They are perpendicular, you mean?

The Witness: They are perpendicular to each other. So if we let the direction of the air flow, the intended direction of the flow of the medium to be filtered, be the corners of the pages as they may align, then the other two dimensions may be repre-

(Testimony of Sydney F. Duncan.)

sented by the bottom edge of the cover of the book and the side edge of the cover of the book. These two dimensions, then, are perpendicular to each other and are in a plane which is perpendicular to the direction of the flow of the medium to be filtered.

The Court: Yes. In other words, assuming the medium to be filtered flows in one direction, the other two dimensions are what you call "both dimensions"?

The Witness: Both dimensions.

The Court: And they are both perpendicular to the direction of the flow?

The Witness: Yes.

The Court: That is, the bottom of the book and the face of the book are perpendicular to the thickness of the book?

The Witness: Yes.

By Mr. Harris:

Q. A third dimension of the Farr panel as shown in the '479 patent is its thickness, is it not?

A. Correct. [233]

Q. Now, referring to the round Farr filter which is Exhibit D, is the face of the filter subdivided in both dimensions in the same sense?

A. I say yes.

Q. Explain your answer. How is it subdivided in both dimensions?

A. It is divided by the fact that as you follow a line which lies in the face of the filter, which would be a line at least of the dimensions perpendic-

(Testimony of Sydney F. Duncan.)

ular to the intended direction of flow of the medium to be filtered, you cross screen layers. If you assume the third dimension, the axis to be, say, going into a particular one of the passages formed with the crimped screen layer, and you choose the two dimensions in the face of the filter, so that one of them is radial of the round filter and the other one is tangential to a circle in the face of the filter, then, following either one of those lines, we find that we encounter areas of screen through which we have to pass, and, therefore, we have multiple subdivision in both dimensions of the face of the filter.

Q. Well, with this round filter, your dimensions could be any radii of the filter, could they not?

The Court: What?

Mr. Harris: Radii.

A. They would have to be 90 degrees to each other. [234] There could not be two radii which were 30 degrees apart, unless you define a special dimensioning system.

By Mr. Harris:

Q. Well, Mr. Duncan, can you say a circle has more than one dimension, that is, radius?

A. Well, if you are defining the circle as the line or if you are talking about a circular area, a circular area certainly has two dimensions.

Q. What are they?

A. They are two radii at 90 degrees to each other. The size of the circle is constant. There is only one size to the circle, but the circular area lies in a two-dimensional plane.

(Testimony of Sydney F. Duncan.)

Q. Now, we have been talking about the face of the Farr panel shown in the '479 patent. Is that true that the alternate screens, crimped and uncrimped screens, subdivide the panel in both dimensions throughout the thickness of the panel?

A. Yes.

Q. And in the Farr panel shown in the patent in suit, that subdivision provides passageways which extend from the inlet to the outlet faces of the panel, does it not?

A. The crimped screen provides the passageways. [235]

Q. And those passageways, each of them, is wholly surrounded by a crimped screen?

A. Yes, in the Farr filter.

Q. Well, I shouldn't say that, that is misleading and the record shouldn't show it, because I think one wall of each one of those passageways will be a flat screen. That is correct, is it not?

A. (Pause.)

Q. I don't want to mislead you.

A. In the example——

The Court: It still surrounds it even though it is flat, does it not?

By Mr. Harris:

Q. My question was, don't the crimped screens wholly surround the passageways. I don't think that is correct.

A. In Exhibit 2 the passageways are partially bounded by flat screen and partially bounded by crimped screen.



(Testimony of Sydney F. Duncan.)

Q. Those passageways go clear through and are confined or restricted passageways, are they not?

A. Yes.

Q. Now actually, so far as the Farr patent in suit is concerned and the panels made in accordance with it, you don't much care what the condition of the subdivision is at the face of the panel, what you care about is the subdivision throughout the thickness of the panel, isn't that correct? [236]

A. I like the subdivision at the face and other places.

Q. Well, if you merely had a subdivision at the face you wouldn't necessarily have any filtering action taking place if it wasn't subdivided back in the depth of the panel, would you?

A. I don't see why we wouldn't have filtering action take place.

Mr. Harris: I produce a model which I ask be marked as Defendants' Exhibit G for identification.

(The model referred to was marked Defendants' Exhibit G for identification.)

By Mr. Harris:

Q. Showing you this model, Mr. Duncan, which contains at the bottom—first of all, at the top it has a plate on the outside with the word "Farr" on it at the top. We will call that the top.

A. Yes.

Q. Now at the bottom it has a number of layers stacked of the same type of filtering media that is used in the Farr panel, does it not? I don't mean

(Testimony of Sydney F. Duncan.)

with regard to the size of the mesh or the exact crimps, but it is generally similar?

A. It is typical.

Q. Yes? A. Yes. [237]

Q. The upper portion of that model has alternate crimped and uncrimped layers of wire mesh which are spaced apart on the rods that extend vertically through it, do they not? A. Yes.

Q. Now, then, taking the layer of crimped material which is first above the stacked layers at the bottom.

A. And spaced away from them for approximately  $\frac{3}{8}$  of an inch?

Q. Yes, that is the layer I am referring to.

Now, then, if we bend one edge of that layer down so it hooks onto the flat screen in the layer below it all the way across, then we have, do we not, so far as that layer and the flat screen layer below is concerned, a multiple subdivision of the face in two dimensions? A. Yes.

Q. But if we turn this around there is wide open space between the face and the back of the filter panel between those two layers, isn't there?

A. I think of the filter as having two faces. The face of the panel is the rough plane on which you can terminate the filter media and it has a face on each side.

I don't think I have restricted any of my thinking or remarks to the front being the face and the back being something else, so that this face of the filter which is now [238] toward me with this bent down,

(Testimony of Sydney F. Duncan.)

which you have described is not multiply subdivided but the face which is away from me is multiply subdivided.

\* \* \* \* \* [239]

By Mr. Harris:

Q. Mr. Duncan, yesterday in your direct examination, relative to the bulletin, Exhibit No. 7, and various tests that you made, you stated in effect that the Farr type panels were rated at 1200 cubic feet of air per minute, whereas, the Air-Maze Type B panel was rated at 800 cubic feet of air per minute. My understanding was that you stated—and I think the record is clear that you did—that the Farr panels that were brought out initially by the Farr Company were rated at 1200 cubic feet per minute. That is not a fact, is it? As a matter of fact, the Farr panels, when they first came out, were rated at 800 cubic feet per minute, just as was the Type B Air-Maze panel?

A. I think that may be right. I don't remember for sure.

Mr. Harris: I produce a Farr catalog, which I ask be marked as Defendants' Exhibit H for identification.

(Said catalog was marked Defendants' Exhibit H for identification.) [240]

By Mr. Harris:

Q. Mr. Duncan, do you recognize this catalog as a catalog published by the Farr Company as early as 1941?

(Testimony of Sydney F. Duncan.)

A. It is a Farr Company catalog, but I am not sure of its date, because I don't find a mark on it, and I don't remember precisely when each one of the catalogs was published.

Q. I call your attention to the statement on the second page of that catalog, under the heading "Test Data." It states, "All metallic wire screen permanent type, 800 cubic feet through 20 by 20 by 2-inch filter." I show that to you. A. I see it.

Q. Do you recognize that as a representation made by the Farr Company to the trade at that time? A. Yes.

Mr. Harris: I might further identify this catalog as Bulletin No. F-161.

Q. Referring back to the catalog, Plaintiff's Exhibit No. 7, of which you have a copy in front of you, on the back of that catalog, the second view from the top in the left-hand column, the rotary cooler, does that device have a construction as disclosed in the Farr Patent No. 2,286,480? You are familiar with that Farr patent, are you not?

A. Yes. I have a copy here.

Q. Is the construction of that device shown in the [241] catalog substantially similar to that described in the Farr patent I just numbered?

A. Yes. [242]

Q. And is the face of the panel in that device subdivided in both dimensions perpendicular to the flow of air through the device? A. Yes.

Q. Now in the '479 patent here in suit, is it unnecessary to pass the air, or to have the air pass

(Testimony of Sydney F. Duncan.)

through, the screens of that filter panel in order to get the desired filtering efficiency?

A. Did you say is it unnecessary?

Q. I said, is it or is it not necessary to have the air pass through the screens to get the desired filter efficiency.

A. It is necessary to have the air pass through the screen, at least some of the air pass through the screen.

The Court: Not all the air?

The Witness: Not all the air has to pass through the screen in order to achieve the efficiency.

The Court: But enough has to pass through to create a turbulence in the air that does not, so that it comes in contact with the mesh, is that it?

The Witness: Yes, your Honor.

By Mr. Harris:

Now all of these four filters of the type of the '479 patent in suit prior to use are dipped in oil, are they not? A. Yes, they are. [243]

Q. And if that oil fills the mesh of the screens the air could not pass through the mesh, could it?

A. No.

Q. So that whether the air passes through the mesh of the screens or not depends in part upon the viscosity of the oil used, is that correct?

A. Yes.

Q. And upon the size of the mesh of the screen used? A. That is right.

Q. And it also depends upon the temperature conditions under which the particular filter panel is used, doesn't it?



(Testimony of Sydney F. Duncan.)

A. The temperature conditions under which it is dipped?

Q. Well, suppose we had one of these filter panels of the Farr type in Nome, Alaska, as of the winter season, and we dipped it in 50 S.A.E. oil, put it outside in an outside installation, the oil would very quickly congeal and probably freeze, would it not?

A. I don't think the oil would freeze.

Q. It would at least congeal very solidly?

A. Well, we were speaking a while ago about manufacturer's recommendations and the manufacturer's recommendation, at least ours, to the customer is that he dip his filter, if he dips it, at a specified temperature, say around 70 degrees, or room temperature, as we ordinarily encounter it, [244] and that prior to installation in the place where it is to collect dust that it be allowed to drain for a specified period of time.

Now, then, I don't know from your question whether you contend that these recommendations shall be followed or not.

Q. I am not interested in the recommendations; I am interested in what happens when a buyer uses one of these filters in Nome, Alaska, under the circumstances which I have named.

The Court: Where would he dip the oil, outdoors or indoors?

Mr. Harris: I don't care where he dips it, just so he gets the oil on it and hangs it outside immediately without letting it drain.

(Testimony of Sydney F. Duncan.)

Q. Now under those circumstances, wouldn't the mesh of the screens be effectively plugged with congealed oil?      A. They might be.

Q. So that whether or not the air will go through the screens in the Farr filter depends, in addition to the other factors you have mentioned, upon the atmospheric conditions under which it is employed and the conditions under which it is dipped and prepared for use, does it not?

A. If you include all possible combinations of those things, the answer has to be yes.

Q. And do you find any statement or teaching in the [245] '479 patent in suit that the viscosity of the oil used has anything to do with the effectiveness of the filter?

A. As I remember it, the viscosity of the oil is not mentioned.

Q. Do you find anything in the patent in suit which indicates that the size of the mesh of the screen is at least critical in that respect?

A. I think I can find it in just a minute. (Examining document.)

On page 4 of the '479 patent in line 18, in a portion of the patent discussing the mode of operation of the patent——

Q. The first or second column?

A. The second column—the sentence starts in and reads this way: “This indicates that the air entering the passage 7 is almost immediately broken up into fine streams of air flowing through the screening openings of the wire forming the passage.”

(Testimony of Sydney F. Duncan.)

This teaches me that the arrangement, the combination of size of mesh, size of wire, conditions of dipping, viscosity of oil, and so forth, must be such that air can flow through the holes in the screen.

Q. But for the particular condition of operation, you would have to determine that by experiment, wouldn't you?      A. Yes.

Q. Now in the filter panel of the '479 patent, there [246] is no compulsion for air to pass through the flat screens embodied in it, is there?

A. No, I would say not. There is not compulsion in the usual sense of the word.

Q. Now you said I think that in the Air-Maze P-5 filter charged to infringe the patent in suit, that the alternate crimped sheets subdivide the panel into—they are subdivided in two dimensions perpendicular to the flow of air through the filter panel. I don't know whether I am paraphrasing you correctly, but that is the effect of your testimony, is it not?      A. Yes. [247]

Q. Did you mean throughout the depth of the panel or only at the face of the Air-Maze P-5 panel?

A. I did not specify any particular location, but it may be subdivided at the face, either at the face or at other points in the panel.

Q. There are, however, in the P-5 filter no well-defined passages or channels through the filter bed, are there?

A. There are quite well-defined passages or described lines as tunnels formed by the Z-crimp, the so-called Z-shaped crimp, with two changes in direction.

(Testimony of Sydney F. Duncan.)

Mr. Harris: I produce a plastic model which I ask be marked Defendants' Exhibit I, for identification.

(The model referred to was marked Defendants' Exhibit I for identification.)

Mr. Harris: I might say that these two strips of plastic are held together by a rubber band, in their present state.

Q. Mr. Duncan, would you examine these and see if, in fact, each of those plastic strips doesn't correspond in general configuration to one of the mesh sheets in the Air-Maze P-5 filter?

A. Each one of these strips is apparently formed in a die, with corrugations in what has been called a Z shape similar to the screen media of Plaintiff's Exhibit 6; yes, [248] I think these conform.

Q. Now, I call your attention to the fact that one of these strips has green paint or green dye or some kind on the crests of the corrugations, and the other strip has red paint or dye on the crests of its corrugations. That is correct, is it not?

A. Yes, there are green stripes on one and red stripes on the other.

Q. And these, as put together here, are with the dyed crests adjacent to each other, in other words, they are on the inside of the two strips as we have them here?           A. Yes.

Q. Now, isn't it a fact that when you look through this plastic model, the green lines will rep-

(Testimony of Sydney F. Duncan.)

resent the crests of the corrugations on one strip and the red lines will represent the crests of the corrugations on the other strip?      A. Yes.

Q. And isn't it a fact it is only where those green and red lines appear to cross or touch that there is any contact between the two strips?

A. That would be true.

Q. And isn't it a fact, also that with a construction of this kind, air can pass laterally from one side of the filter bed to the other side, not through it from front to back, but laterally through it, without ever going through [249] any screen member?

Mr. Leonard S. Lyon: Are you asking the witness whether that is true in operation of the filter or just as you are holding that specimen in your hand?

Mr. Harris: Well, I am asking as to this, whether or not there are openings which pass——

The Court: You mean in those two plastic things?

Mr. Harris: In these two plastic things, which pass from side to side of the filter.

The Court: They are not perforated like screens.

Mr. Harris: That is right, your Honor, but air could pass directly from side to side through this plastic model, could it not?

The Witness: I don't think it could do it, in a straight line, at all.

By Mr. Harris:

Q. However, there are openings which go through laterally from side to side, open spaces through which air could move, possibly?



(Testimony of Sydney F. Duncan.)

Mr. Leonard S. Lyon: In the operation of the filter?

The Court: In the operation of the plastic model.  
\* \* \* \* \* [250]

The Witness: Well, I think I can answer it in this way: There is a path in this plastic model that air could follow and traverse the model laterally to the direction, the general direction, of air flow in the filter, for which this is some kind of an example. [251]

Mr. Harris: I produce a sketch which I ask be marked as Defendants' Exhibit J for identification.

(The document referred to was marked Defendants' Exhibit J for identification.)

By Mr. Harris:

Q. Mr. Duncan, I show you Defendants' Exhibit J for identification, with the intent that this illustrate by a drawing the plastic model which we have just identified as Defendants' Exhibit I. Assuming that the red and green lines in this drawing again indicate the crests of the corrugations as shown by Exhibit I, and that the only places where the two adjacent members meet are where the red and green lines touch or cross, that being the case, a flow of air in the direction of the blue arrow underneath the sketch, flowing in through one of the entrance openings in the filter panel, could divide and go through a very large number of paths going from the upstream side to the downstream side, could it not, as indicated by the blue lines in this sketch?

Mr. Leonard S. Lyon: This is in respect to this

(Testimony of Sydney F. Duncan.)

plastic model, not in respect to the Air-Maze P-5 devices, although I notice the title on this page isn't incorporated in your statement, in your question.

The Court: Does your question relate to the Air-Maze P-5 as constructed, or does it relate to the plastic panel?

Mr. Harris: Well, this relates to the Air-Maze P-5 as [252] constructed.

The Court: That is your assumption in the question, is it?

Mr. Harris: Yes, your Honor.

The Witness: There are a number of paths—with an entering air stream, or filament entering, as you said, one of the openings in the face of the P-5 filter, there are several paths that that stream of air can be divided into and pass through the filter by following portions of the passages formed by the crimp of the P-5 filter. [253]

The Court: Well then——

The Witness: Whether the exact pattern is as shown on Exhibit J or not, I am not prepared to state on short notice, but the pattern would be something like this.

The Court: Assuming that these were crimped screens.

The Witness: If they were crimped screens——

The Court: That is what his assumption is.

The Witness: That is right. My answer was made on that basis, that entering one of the openings formed by two crimps registering on the face of the filter, there are a number of paths that the air

(Testimony of Sydney F. Duncan.)

stream defined by this opening could be divided into and pass through the filter by following portions of the passages formed by the crimps of this screen layer.

The Court: In other words, some of the air would take this path, others would go straight through the holes in the screen?

The Witness: Undoubtedly.

The Court: Some might go up, some might go down.

The Witness: The only way that the air can get through the plastic model——

The Court: He is talking about the screen now.

The Witness: I wish to compare the plastic model for a moment.

If it enters one of those little openings on either edge [254] it has to flow down a passage formed by the crimp and then in order to avoid going through the plastic, which of course is imperforate, then it has to be deflected up and over one of the red or green crests.

Now a similar path exists through the P-5 screen media but the air would have to be deflected up and over the crest of the screen which has holes in it.

This would not insure any particular amount of air following this blue path through the filter or any portion of it without ever passing through a screen.  
By Mr. Harris:

Q. Well, now, as to the diagram J, Exhibit J, actually the blue lines are not intended to represent a flow in one plane. Actually, in the Air-Maze P-5

(Testimony of Sydney F. Duncan.)

filter the air through any of those paths must flow up and down, over and under the corrugations, would it not?

Mr. Leonard S. Lyon: Just a minute. Are you asking about what the air would do in the actual operation of a P-5 filter?

Mr. Harris: Yes, sir.

Mr. Leonard S. Lyon: You haven't had the witness answer that.

The Court: He just got through asking him.

The Witness: It is asking quite a bit of a filament of air to decide to go up and over, but I have already said [255] that a path exists through the filter going up and over and under and around the screen crimps, so that the path exists.

The Court: If all the holes in the screen were filled, would it take this pattern?

The Witness: Yes, in the plastic model——

The Court: I mean in the wire model, if they were all filled up and clogged up.

The Witness: Then we have essentially the plastic model. Then it could take this kind of a path which would involve flow up and down.

The Court: In that P-5 filter, is there any turbulence created by virtue of the air passing through the holes of the screen?

The Witness: Just in the same fashion as in the Farr filter.

By Mr. Harris:

Q. Now referring to this sketch, Exhibit J, there are little round circles in ink on this sketch which

illustrate the points of intersection or touching of the red and green corrugation lines.

A. I see them.

Q. Now those are only obstructions other than the formation of the crimp itself to the flow of air through the P-5 filter, are they not?

The Court: Made of screen? [256]

Mr. Harris: Yes, they are made of screen.

The Witness: Yes, this is the filter made of screen.

Mr. Harris: Yes.

The Witness: And the question, as I understood it, these little circles, which could be drawn all over the place——

Mr. Harris: Yes.

The Witness: There are just a few of them drawn instead of all of the ones shown——

Mr. Harris: Yes.

The Witness: Those represent, as you said, the places where a crimp, one crimp of one layer, touches the crimp of another layer.

Mr. Harris: Yes.

The Witness: Those constitute obstructions to air flow. That is right.

The Court: His question was, were they the only obstructions? Was that not your question?

Mr. Harris: I will ask that question.

Q. Are they the only obstructions?

The Court: I thought that was your question.

The Witness: The only obstructions other than, as you said, the undulations necessary to get over



(Testimony of Sydney F. Duncan.)

the top of one crimp and into the next valley, so to speak. [257]

By Mr. Harris:

Q. So that any of these pathways through the Air-Maze P-5 filters are interconnected, or is interconnected, with other adjacent passageways laterally, is it not, by open spaces?

A. Not exactly laterally, according to your sketch. The connections are at some angle to a line perpendicular through the filter or a line laterally through the filter, but they are interconnected.

Q. Are these obstruction points, the little circles illustrated here, are those the parts that subdivide this Air-Maze P-5 filter in two dimensions relative to the direction of flow of the air?

A. They certainly do in my estimation subdivide the panel in two dimensions.

Q. Are those the only things that subdivide them in two dimensions?      A. I think so.

Q. Now, Mr. Duncan, I am standing approximately in the middle of this court room. Assume I was tall enough to reach the ceiling. Would I subdivide the court room in the horizontal plane within the meaning that you use the word "subdivide" when referring to this Air-Maze construction? I am just a pillar here standing clear up to the ceiling, all alone, the air can go around me on both sides; do I subdivide [258]this courtroom in a dimension in the horizontal plane?

A. In the plane of the courtroom in which you stand and air flows around you on two sides, your

feet on the floor, your head in the ceiling, you certainly divide the air flow at that point, subdivide, if you please, into two streams.

Q. And that is the sense in which you say that these points of intersection in the Air-Maze P-5 filter subdivide the air flow?

A. Cause a subdivision of the airflow.

Q. You have been employed as a consultant by Far Company or its predecessor since about 1939, have you?

A. I have consulted with them, as I said, as a friend and a consultant since that time.

Q. And this year you are on sabatical leave from the university?

A. It is not exactly sabatical leave. There is a technical difference. It is just a leave.

Q. Very well. During this year, however, you are spending full time with the Farr Company?

A. That is right.

Q. And you are being paid for your time, are you not?

A. Oh, yes.

Q. Monthly? A. Monthly. [259]

Q. Are you an officer of the Farr Company?

A. No.

Q. Are you a director?

A. I have the title of Director of Research.

Q. Are you a member of the board of directors of the Farr Company?

A. No.

Q. Are you a shareholder in the Farr Company?

A. No. [260]

\* \* \* \* \*

(Testimony of Sydney F. Duncan.)

Redirect Examination

By Mr. Leonard S. Lyon:

Q. Will you refer to Defendants' Exhibit F, the bulletin A-100-4, and on the second page is Fig. 3, typical applications of air filters to unit type equipment.

A. (Examining exhibit.)

Q. You were asked some questions about the arrangement of the filters as shown in that figure.

The Court: Fig. 3?

Mr. Leonard S. Lyon: Yes, Fig. 3.

Q. Will you tell us whether these illustrations, each one of them which bears a legend, which of these illustrations refer to the prior art filters and which of them refer to the arrangement of Farr filters?

A. The filter under which one of the little figures [262] only mentions Farr filters is in that figure to the extreme right which reads, "Equal Area, Far-Air Filters." The point made by the sequence of little figures is that with the higher air capacity of the Farr filter these various arrangements shown as expanded filter, offset filter, slanted filter, double slanted filter, need not be adopted to install Farr filters.

Q. Will you refer to Exhibit 11?

A. I don't have it.

Mr. Leonard S. Lyon: Do you have Exhibit 11, Mr. Clerk?

(The exhibit referred to was passed to counsel.)

(Testimony of Sydney F. Duncan.)

By Leonard S. Lyon:

Q. You were asked if there was any difference in performance shown by the curves on this Exhibit 11 up to a dust load of 500, and I think you testified there was no substantial difference up to that point.

What is the significance of the difference that appears following the dust load of 500 as shown by that exhibit?

A. The significance of the different shapes of the pressure drop characteristics and the efficiency characteristics for the two filters compared on this Exhibit 11 illustrate, as I said before, the difference in mode of operation of the two filters. It is true that if one covers up the right-hand half of the page that there are two sets of curves which are not too different from each other. [263]

If, however, through inadvertence of some other atmospheric, unusual atmospheric condition, the load on either one of these filters were to pass 500 grams on a 20 x 20 panel, then the characteristic curves shown to the right of 500 grams would go into effect and on one filter the pressure would rise rapidly, whereas on the Farr filter the pressure rises very slowly, thus demonstrating again the difference in mode of operation. To be sure, the so-called Air-Maze type B efficiency also rises but that, as I explained before, was because some of the openings were getting too small to pass dust.

Q. Is Exhibit 11 intended to signify that there is no significance, no importance, to the fact that

(Testimony of Sydney F. Duncan.)

the curves remain substantially the same up to the 500 point dust load?

\* \* \* \* \*

The Witness: No, these curves are not intended to show the similarity below 500, but the load tests had to be carried out further to demonstrate the characteristic operation of the two types of filters. [264]

Mr. Leonard S. Lyon: May I have Exhibit 6, please?

(The exhibit referred to was passed to counsel.) [265]

By Mr. Leonard S. Lyon:

Q. I hand you Exhibit No. 6, which is the Air-Maze P-5 filter medium, and ask you if, by using a piece of string, you can demonstrate to the Court whether or not there are passages through the filter which the air can take without passing through any screen or shifting from one passageway to the other.

A. I can, if I have a piece of string, but the string would simply be laid in one of these corrugations.

Mr. Leonard S. Lyon: I would like to show it to the Court. I would like the Court to see it.

The Witness: And the two of them be back together, if that will do.

In this fashion here (illustrating). You see, the string is loose and can be—well, it should be a heavier piece of string. It doesn't do exactly what



(Testimony of Sydney F. Duncan.)

I would like it to do. With a larger cord, it could be laid right in the Z-shaped crimp and pass right through the filter.

By Mr. Leonard S. Lyon:

Q. Now, in Exhibit 4, the Air-Maze Type P-5 bulletin, reference is made on page 2 to the “‘Z’ shaped channels (see illustration at right).” Will you compare the paths through the filter, which you have just demonstrated with the string on Exhibit No. 6, with the channel indicated by the arrows on the figure appearing at the lower right-hand corner of [266] Exhibit 4?

A. The arrows indicate the same passage as I attempted to demonstrate with the string. The bulletin reads, “Arrows show how more than a million tiny openings plus three changes of air flow, remove dirt from air stream and deposit it evenly on viscous-coated wire baffles.” And then the arrows show flow entering the Z-crimp and going right straight through the Z-crimp.

Q. Now, will you tell us what would happen to the air—and if different things happen to different parts of the air, what different things happen to the air—in passing through the Air-Maze filter, the P-5 filter?

A. Well, the same fundamental division of the air stream into many fine filaments takes place initially at the face of the filter. I think perhaps this can be seen in one of the pieces of Exhibit 15, that is that plastic chunk with media in it.

(Testimony of Sydney F. Duncan.)

Exhibit 15 is in a little box there. That is it. A long thin piece of this plastic shows the initial subdivision into a number of finer or small filaments of air flow.

If the mesh of the screen is open, a certain amount of flow will take place through the mesh of the screen; whereupon, the air flowing through the mesh of one small area of screen will find itself in another passage, causing turbulence in that passage, and proceeding thus through the filter, [267] having always the opportunity to flow either through the mesh of the screen or through a passage, depending upon the pressure and the conditions in the filter, dirt loading, oil coating of the wires, and so on, the factors, the flow will be complex and not particularly easy to describe, but certainly it embodies these features of having the presence of flow either through the passage or through the mesh of the screen.

\* \* \* \* \*

Q. Well, I want you to describe the operation of the Air-Maze filter, now, both with respect to what function is [268] provided by the passages through the filter and by the subdivisions formed by the wire mesh.

A. The subdivisions formed by the wire mesh are these contact points where the corrugations or crimps touch each other, subdivide the approaching air flow into many fine filaments. These filaments, then, through flowing into passages that are relatively rough and through encountering small

(Testimony of Sydney F. Duncan.)

areas of screen that are at an angle to their general flow, part of the air flows down the passage a little ways, some of it flows through the screen and into an adjacent passage, and this flow down the passage and through the screen takes place on through the filter. As to whether the screen mesh becomes clogged completely or not, any reduction in size of the screen opening through an accumulation of dirt on the wires of the screen will restrict the flow through the mesh of the screen and so deflect more and more of it down the passages formed by the crimp of the screen, and, while it has been remarked that the pictures of Exhibit No. 14 do not show screen meshes that are completely plugged, it does show definitely that many of the screen meshes are seriously closed off and so would impede the air flow through them. The test could have been continued until they were plugged.

Q. Well, will you compare what you have said now with respect to the operation of the P-5 filter with the operation that takes place in the Farr filter of the patent in suit? [269]

A. Well, it has been pointed out that there is no "compulsion of the air to flow through the flat screen" in the Farr filter, however, there are small areas of screen disposed at various angles to the general flow of air, and so, air flowing into the upstream side or face of the filter is subdivided by the crimped screen into small filaments. These filaments, while they are first divided so as to flow into a passage, immediately encounter screen mesh

(Testimony of Sydney F. Duncan.)

areas and so part of the air flows perhaps a little ways along the passage, but part of it flows through a small area of screen and into an adjacent passage where it causes turbulence just as in the P-5 filter.

Q. Now, is it essential to the operation of both the P-5 and the Farr patented filter of the patent in suit that there be a screen wire or mesh through which part of the air flows and forms turbulence?

A. Yes.

Q. You have been asked some questions about oiling the screens. Was there anything new or original about oiling a filter made of wire screen at the time that this Farr filter was invented, or was that an old practice in this art?

A. As I understand it, it was an old practice.

Q. Would you, as an engineer reading the Farr patent in suit, have any difficulty in finding a suitable oil for use in the Farr filter, patented filter? [270]

A. No; no particularly difficulty.

Q. Would you understand, from reading the patent in suit, that you should use such an oil and take such pains in draining that the perforations through the wire screen should remain open at the beginning of the operation of the filter?

A. Well, I quoted a portion of the patent a few moments ago that describes the flow as having to take place through the mesh of the screen. Therefore, it must be open. Just a matter of house-keeping would indicate to me that I should let the filter drain a while to get ride of the excess

(Testimony of Sydney F. Duncan.)

oil or I would have a dripping all over the place when it is installed. And the use of suitable oil would then depend upon just my judgment as to whether I wanted a heavy oil or a light oil or whether I was at the North Pole or at the Equator.

Q. Are the oils that are used in oiling these Farr patented filters commercially available oils, or did any special oil have to be designed?

A. No, no special oil had to be designed. We might achieve better results with a special oil, and some people or some companies have a particular oil that they recommend. We have used airplane engine crankcase oil, the usual kind, for coating some filters.

The Court: After it has been filtered? [271]

The Witness: Before it has been used.

The Court: Before it is used?

The Witness: Yes.

By Mr. Leonard S. Lyon:

Q. Is it necessary to use any particular oil to oil the Farr patented filter?

A. No, sir. I don't think so.

Q. Do you know what oil is used to oil an Air-Maze P-5 filter?           A. No.

Q. Now, in the operation of the Air-Maze P-5 filter, will you tell us how the air passes through that filter with respect to whether or not there is any lateral flow of air across the filter that doesn't go through the wire mesh or wire screen?

A. When the filter is installed and passing air through it in its normal direction, from one face



(Testimony of Sydney F. Duncan.)

to the other, there will be a pressure drop through the filter. This pressure drop through any filter doesn't take place just at the face or just in the middle—it is a gradual thing that takes place through the filter. It is a principle of fluid mechanics that in general the flow will be toward a place where the pressure is lower. There are some exceptions to this, but in the case of the filter the principle applies fairly well. [272]

Now, the pressure distribution laterally of the filter at any given plane, say half an inch or an inch from the face of the filter, will be probably pretty uniform, so that there will not exist serious pressure differences which will cause flow laterally in the filter. If such flow does take place, it will have to make several changes in direction to get anywhere.

If I may have Exhibit 15 again, the plastic cast filter. Exhibit 15 shows in one of the cut faces quite clearly the kind of lateral path that exists in the filter. Examining this passage right here, defined by the ends of the wires as they meet the surface of the cut plastic on the lowest step, there is a winding passage which extends laterally of the filter. In order to follow that passage, the air would have to make numerous changes in direction, to avoid going through a screen.

Q. I wanted you to say as to whether or not, in the operation of the Farr filter, the air does actually move laterally from one channel through the screen to another, without going through the screen.

(Testimony of Sydney F. Duncan.)

A. In the Farr filter or the P-5?

Q. The Air-Maze P-5.

A. The Air-Maze P-5.

The Court: That is just what you are explaining, the P-5?

The Witness: Yes. But I understood Mr. Lyon to say the [273] Farr filter.

Mr. Leonard S. Lyon: I am referring to the P-5 filter.

The Witness: There is very little tendency for lateral flow to take place in the P-5 filter media, because principally of the numerous changes in direction that it must have, and because there is no particular pressure gradient or decrease of pressure laterally in any particular direction to cause that flow to take place. [274]

\* \* \* \* \*

## RICHARD SPENCER FARR

called as a witness hereinby and on behalf of the plaintiff, having been first duly sworn, was examined and testified as follows:

The Clerk: State your name in full, please.

The Witness: Richard Spencer Farr.

The Clerk: And your address?

The Witness: 4810 Keniston Avenue, Los Angeles 43.

### Direct Examination

By Mr. Leonard S. Lyon:

Q. Mr. Farr, how old are you? A. 36.

(Testimony of Richard Spencer Farr.)

Q. What is your occupation?

A. I am president of the Farr Company in charge of sales and engineering.

Q. How long have you been connected with the Farr Company? [275]

A. Since its inception in 1937.

Q. Were you related to Morrill N. Farr, the inventor named in the patent in suit, 2,286,479?

A. Yes, I am his son.

Q. Who was associated with you in the formation of the Farr Company?

A. My father, my brother, and myself.

Q. Your brother is Spencer Farr?

A. Yes, Morrill Spencer Farr.

Q. Who is here in the court room?

A. Yes, sir.

Q. At that time was your father active in the formation of the Farr Company?      A. Yes.

Q. And how long did he remain active in the operation of the Farr Company?

A. Until he passed away in November 24, 1949.

Q. Now at the start of the Farr Company, did you start the Farr Company as a completely new business?      A. Yes.

Q. And who were the organizers of the Farr Company?

A. Well, my father, my brother, and myself.

Q. And when you first started the operation of the Farr Company, did you start in business by manufacturing an air filter? [276]

A. No, sir.

(Testimony of Richard Spencer Farr.)

Q. When did you start the first operation of the Farr Company?

A. Repeat the question, please.

(The question referred to was read by the reporter, as follows:

(“Q. When did you start the first operation of the Farr Company?”)

The Witness: July 1937.

By Mr. Leonard S. Lyon:

Q. And you started in as sales manager at that time in charge of sales and engineering?

A. At that time there were just the three of us, and we all did everything.

Q. How long was it after the Farr Company started in operation before you started the manufacture of an air filter panel?

A. If my memory serves me correct, we started manufacturing the air filter panel in 1940.

Q. Have you continued the manufacture of that air filter ever since?      A. Yes.

Q. Have you manufactured any other type of air filter except the filter described in the patent in suit, No. 2,286,479? [277]      A. No.

Q. Now are you familiar, as an engineer or technical man, with the construction and mode of operation of that Farr filter?      A. Yes.

Mr. Harris: Excuse me, if the Court please. I don't believe there is any foundation as to what this witness' engineering or technical qualifications are.

(Testimony of Richard Spencer Farr.)

Mr. Leonard S. Lyon: I will be glad to fill that in.

Q. What technical training did you have before you organized the Farr Company?

A. I attended an engineering school for four years, graduating in 1937.

Q. What school?

A. University of Southern California.

The Court: What branch of engineering?

The Witness: I got a Bachelor of Science degree in general engineering.

By Mr. Leonard S. Lyon:

Q. Now you say that you have been director of sales of the Farr Company since it was organized?

A. Well, that is probably not quite correct. I have been in charge of sales for the past several years. At the start of our company we were just the three of us and we did our manufacturing and selling and all of us did a little of [278] everything.

Q. What are the procedures that you have followed in selling Farr filters of the patent in suit? I mean by that, what do you do to induce a customer to choose one of the Farr patented filters over some other filter?

A. I explain the method of operation of the filter and try to point out to the prospective buyer just how the filter operates, and why it is a piece of equipment that he should use.

Q. Do you make these explanations usually to untrained or to technical people?



(Testimony of Richard Spencer Farr.)

A. Well, a large percentage of our sales are to technically trained people.

Q. Is your explanation usually a technical one?

A. In many cases.

Q. In selling the filter and discussing it with these technical prospective customers, do you refer to the construction of the filter? A. Yes.

Q. Do you also refer to its method of operation?

A. Yes.

Q. Do you make any comparisons of its performance characteristics with other filters?

A. Yes. I explain how it operates.

Q. Do you understand and are you fully acquainted with [279] the test methods and the test equipment which has been worked out by the Farr Company to which Mr. Duncan referred in his testimony? A. Yes.

Q. Do you refer to that test equipment or those test methods and the results of those tests in your discussions with the technical prospective customers on various occasions? A. Yes. [280]

\* \* \* \* \*

Q. What features of construction of the Farr filter do you rely upon and emphasize in promoting the sales of [283] that filter?

The Court: You may have your objection to this line of questioning.

Mr. Harris: Thank you, Your Honor.

The Witness: Well, the features that we have emphasized most of all is its high efficiency, high dust collecting efficiency, its large dust holding

(Testimony of Richard Spencer Farr.)

capacity, and its low pressure loss and low rate of change of pressure loss during the life of the filter between cleanings.

Those are the points that we have emphasized to customers and it has been probably the factors that have made the sale of our product possible.

By Mr. Leonard S. Lyon:

Q. In the beginning of the operations of the Farr Company, when you first undertook to sell these patented filters, what other filters were you trying to outsell?

A. Well, primarily the filters that were being sold on the market at that time, which were those shown and disclosed in the Greene patent—that was one of the large competitors.

Another competitor was the American Air Filter Company, which had a filter that I believe was described earlier, where it had an expanded metal face with slots in it, and went through a series of chain knit wire cloth.

Those at the time we started our business were perhaps [284] the two filters that were being used most widely.

\* \* \* \* \*

Q. Will you state as you knew them, if you did know them, at the time in question, the characteristics of the filter of the Greene patent which has been shown here to be manufactured by the defendant Air-Maze Corporation? How did its characteristics compare with the Farr filter that you mentioned?

(Testimony of Richard Spencer Farr.)

Mr. Baldwin: We object. There is still no foundation as to how he knew.

Mr. Leonard S. Lyon: I think that is a matter of cross-examination.

The Court: Overruled.

Greene, you say?

Mr. Leonard S. Lyon: Yes, Your Honor. That is the old style Air-Maze filter.

The Witness: After we had developed—— [285]

Mr. Leonard S. Lyon: Just a minute, please.

The Court: Go ahead.

The Witness: After we had developed our filter and run our own tests on it and started to sell it, naturally we were interested in seeing what was being offered on the market at that time, and we came across the Air-Maze filters that were manufactured under the Greene patent.

We obtained some of those filters and ran tests to see how our performance compared with the performance of the Air-Maze filter.

Those tests showed up that our filter had a higher efficiency, a greater dust holding capacity, and again a low, uniform pressure loss during the period of feeding dust to the filter.

That was also true of the American air filter that was being sold and widely distributed at that time. By Mr. Leonard S. Lyon:

Q. And the device that you have referred to as the Air-Maze device being sold at that time and manufactured under the Greene patent was exemplified by Exhibit 5 in this case?

(Testimony of Richard Spencer Farr.)

A. That is one of the styles that Air-Maze was selling at that time. Of course, they had many different panels which were being manufactured under the Greene patent. In all cases they were similar to that filter and varied only [286] in the amount of screen that was in the filter and the mesh of the screen that was in the filter. [287]

Mr. Leonard S. Lyon: Can I have Exhibit 1-A?

The Court: There is Exhibit 1-A.

By Mr. Leonard S. Lyon:

Q. Commencing at page 15 of Exhibit 1-A is a document entitled, "Affidavit under Rule 76," which was filed in the Patent Office in connection with the application of the patent in suit, and this affidavit is executed by Richard S. Farr on the 16th day of November, 1940. Is that your affidavit?

A. Yes.

Q. As Exhibit C to this affidavit is a catalog of the Air-Maze Company. I ask you if that is a catalog published by the Air-Maze Company at the time it was selling devices like Exhibit 5, showing you Exhibit 5.      A. Yes.

Mr. Baldwin: Your Honor, I think that is a conclusion that is not justified in the groundwork. In other words, this exhibit was filed years ago. Exhibit 5 probably was not around at that time. There has certainly been no identification shown between Exhibit 5 and this Exhibit C of this old file wrapper.

Mr. Leonard S. Lyon: I asked if this catalog describes the filter of the type that was exemplified here by Exhibit 5.

(Testimony of Richard Spencer Farr.)

The Witness: This information here doesn't give any great description about the filter, although it does refer [288] to 'Type B filters in here.

By Mr. Leonard S. Lyon:

Q. And Exhibit 5 is an Air-Maze Type B filter?

A. That is what the name plate states on it, and I have always assumed that that was a type B filter.

Q. Is that the type of device you were referring to in your affidavit? A. Yes.

Q. Now, commencing at page 34 of Exhibit 1-B is an illustration of certain test apparatus, and at page 36 is a comparative curve. These are referred to in your affidavit and I will ask you what is the test apparatus shown on page 34.

A. That was the test apparatus that we were using at that period for testing and reading air filters.

Q. As compared with the present apparatus that you use, is it qualitatively the same?

A. Well, it is on the same principle. It doesn't have nearly the refinements that our present test set has and, of course, it probably didn't give as good results. They probably were comparative results rather than qualitative results.

Q. But qualitatively, they are the same?

A. Qualitatively, yes.

The Court: On pages 36 it says, "(1) Temper-  
atair." Is that yours?

The Witness: That was our filter. [289]

The Court: The way you used it, then?



(Testimony of Richard Spencer Farr.)

The Witness: Yes.

The Court: Then, "(2) Air Maize Type B" and "(3) Detroit Filter," made out of paper.

The Witness: Yes.

Mr. Leonard S. Lyon:

Q. This set of curves on page 36, are they curves showing the results actually obtained in testing those three comparatively?

Mr. Harris: I object. There is no foundation testimony for that.

The Court: If you know.

Mr. Leonard S. Lyon: Read the question.

(The question referred to was read by the reporter as follows:

("Q. This set of curves on page 36, are they curves showing the results actually obtained in testing those three comparatively?")

The Witness: Yes.

By Mr. Leonard S. Lyon:

Q. Are you familiar with those tests at the time they were made? A. Yes.

Q. Did you participate in and direct those tests?

A. Yes, I probably performed them myself or they were [290] under my direct supervision at that time.

Q. Now, will you refer to the curves on page 36 and point out to the Court the significant things that are revealed by those curves?

A. Well, Your Honor, the top three curves are the efficiency curves of the various filters, and the

(Testimony of Richard Spencer Farr.)

bottom three curves are the pressure drop curves of the filters.

No. 1 in each case is the Farr filter.

No. 2 in each case is the Type B filter.

No. 3 is the Detroit filter.

The efficiency curve on the Farr filter shows, to start out with, about  $98\frac{1}{2}$  per cent, and decreased down to about 92 per cent of the gentle slope. At the same time, the pressure drop on the Farr filter started in at  $4/100$  of an inch and raised to about  $6/100$  of an inch, with a dust load of 16 ounces.

These curves, incidentally, although it does not show on the sheet, were all run at 800 CFM.

The second curve shows the Type B Air-Maze filter, showing a slightly lower efficiency and the static pressure curve has been shown in the curves that Mr. Duncan presented, where the static pressure, after it received a certain amount of dust or dirt load, started to increase very rapidly.

The Court: From .04 up to .20? [291]

The Witness: To .20, .201—I guess it would be .21.

The Court: Yes.

The Witness: This photostat isn't too clear.

The third curve, showing the Detroit filter, shows a pressure drop curve that is higher by about  $2/100$  of an inch, higher than the Farr by about  $2/100$  of an inch, and following roughly parallel to the Farr filter.

The efficiency curve on the Detroit filter started at about 88 per cent, and after it had half a pound

(Testimony of Richard Spencer Farr.)

of dirt fed to the filter, it was at around 85 per cent.

The Court: Why did you stop that curve there at half a pound of dirt, and continue with the others? Why didn't you continue the test on that one?

The Witness: I can't recall why it was stopped at that point. We probably were interested in seeing the typical performance on it as relating to the basic differences in efficiencies, and on the particular test dusts that we were using with the efficiency being approximately 10 per cent less, we probably didn't run it out any further.

The Court: Was the same dust used in all of these?

The Witness: No, Your Honor.

The Court: In each one of the three?

The Witness: In each one of the three, the same dust.

The Court: That is what I mean.

The Witness: Yes, sir, the same dust, the same oil on [292] each of the metal filters. Again, on the paper filter, that undoubtedly was used as it was obtained, with the coating impregnated in the filter.

The Court: And with the same speed and quantity of the air?

The Witness: In this case, all three with the same quantity of air, the same velocity.

By Mr. Leonard S. Lyon:

Q. Now, in the text of your affidavit, commence-

(Testimony of Richard Spencer Farr.)

ing at page 16 of the exhibit, you stated to the Patent Office:

“The filter shown in the above-entitled Farr application and as shown in Exhibit A possesses the following outstanding characteristics:

“(1) Its efficiency in removing dust from aid is higher than any other tested air filter;

“(2) It has the property of maintaining a substantially uniform static pressure during use.”

Up to the time you first encountered the Air-Maze P-5 filter, had you ever found a filter manufactured by any other manufacturer than your company, that possessed those characteristics?       A. No.

Q. Now, when, for the first time, were you encountered in your sales efforts with a competitive filter possessing those characteristics? [293]

A. Well, the P-5 was encountered in about 1948.

Q. And was that the first device, competitive device, that you ever found in selling the Farr filter that possessed those characteristics?

A. Air-Maze had an earlier filter which they abandoned, that operated somewhat on the same basis, with similar performance characteristics.

Q. When was that?

A. I would say that was shortly after the war, maybe 1945 or '46.

Q. Did you testify as a witness in the case before Judge Yankwich tried on the Greene patent, in this court?       A. Yes.

Mr. Leonard S. Lyon: To fix the date of that

(Testimony of Richard Spencer Farr.)

trial, Your Honor, and to confirm my opening statement regarding Judge Yankwich's decision, I will at this time ask that there be made a part of the record in this case a copy of the order for judgment by Judge Yankwich in that case, dated May 15, 1943, and a copy of the findings of fact and conclusions of law entered in that case by Judge Yankwich on June 9, 1943. Of course, this Court will take judicial notice of its own records, but I think it is proper to have a particular part of the records of this Court that we want in this record received as part of the record in this case.

Mr. Harris: We have no objection, Your Honor.

The Court: Admitted in evidence.

The Clerk: No. 17, in two pieces.

Mr. Harris: Which is which?

The Court: Well, make it all in one. It is the findings of fact, conclusions of law, and judgment.

Mr. Leonard S. Lyon: Order for the judgment.

The Court: Order for the judgment?

Mr. Leonard S. Lyon: Yes. That is something in the nature of an opinion by Judge Yankwich.

(The documents referred to were marked Plaintiff's Exhibit No. 17 and received in evidence.)

[Printer's Note: Plaintiff's Exhibit 17 is reproduced in Book of Exhibits.]

The Court: Is there a judgment?

Mr. Leonard S. Lyon: Yes, there is a judgment.

The Court: Is the judgment there?



(Testimony of Richard Spencer Farr.)

Mr. Leonard S. Lyon: It is not there, but I think we should get the judgment, and I will, and have that added to the record.

The Court: Well, if you are relying on the doctrine of *res judicata*, you should have the judgment.

Mr. Leonard S. Lyon: I think we will, and we should, too, Your Honor.

The Court: And you probably should have the pleadings.

The Clerk: No. 17.

The Court: All right. When that is obtained, it may be attached to this exhibit. [295]

Mr. Leonard S. Lyon: Yes.

Q. Reference has been made, Mr. Farr, to the air flow rating which you originally operated under or referred to in selling the first of the Farr filters of the patent in suit. What was that rating?

A. 800 CFM for a 20 by 20 panel.

Q. Why did you employ that rating in your early sales of the Farr filter of the patent in suit?

A. We were in the position of a new company just starting out and we, of course, published our data on what was then considered standard rating. We had the problem of selling customers filters that were interchangeable, we will say, with the filters that were being used at that time.

Of course, in our test work we soon found that our filter could operate at these higher velocities, and while we still published and used that data, the 800 CFM, for a short period of time, we were promoting and selling the outstanding features of the

(Testimony of Richard Spencer Farr.)

filter such as its higher efficiency and higher air-handling capacity.

Q. And when, about, did you begin emphasizing the higher air-handling efficiency of your filter?

A. I don't recall when that would reflect in our literature, but it was almost at the time that we brought out our filter that we started selling them at the higher air-handling capacity. [296]

Q. And was that higher air-handling capacity first provided by the filter of the patent in suit?

A. Well, the design features of our filter are such that it will handle 50 per cent more air than the then considered standard filters, and when I say handle that much more air, that is given it, delivering higher dust efficiencies, higher dust-holding capacity, and as low or lower pressure loss.

Q. When did you first encounter a filter, a competitive filter, in the trade which would meet that higher air-handling efficiency or capacity?

A. I believe I answered that question earlier, that that was in 1945 or 1946.

Q. And what filter was that?

A. That was the early P-5 which I understand has been abandoned.

Q. Will you describe for the Court the difference between that early P-5 abandoned filter and the current P-5 Air-Maze filter which is accused in this suit?

A. The early P-5 filter that we met in competition was a filter made of a series of layers of corrugated screen wire. The sheets of screen extend-

(Testimony of Richard Spencer Farr.)

ing in the general direction of the air flow through the panel, that of course is similar to the present P-5. The difference between the early P-5 and the later P-5 is that the channels are formed by the corrugations [297] on the sheets in the early P-5, and straight through the filter at an angle to the general direction of air flow, but had no change in that system.

The Court: No zigzag?

The Witness: Having no zigzag.

The Court: It was straight but angular?

The Witness: Straight, yes.

By Mr. Leonard S. Lyon:

Q. I show you Plaintiff's Exhibit 1-B in this case, which is a copy of the original filed application for the patent in suit, and particularly Fig. 3 of the drawings of that application. How does that device compare with this earlier abandoned Air-Maze filter which you have called attention to?

A. In appearance it is identical. There is the passage (indicating).

The Court: I see. [298]

Q. Mr. Farr, have you read over recently each of the statements made in your affidavit that you filed in the Patent Office in connection with the prosecution of the application of the patent in suit?

The Court: Read over what, his affidavit?

Mr. Leonard S. Lyon: Yes, each of the statements.

The Witness: Yes.

(Testimony of Richard Spencer Farr.)

By Mr. Leonard S. Lyon:

Q. And you have them currently in mind?

A. Yes.

Q. Are each of these statements true as of your present knowledge?

Mr. Baldwin: I object on the same ground that we objected to the introduction of Mr. Duncan's affidavit and not being caught short twice the same way I have all the matter underlined, if you want me to call attention to it.

The Court: Very well.

Mr. Baldwin: On page 16 of the file wrapper the statement up near the top of the sheet read a little while ago: "Its efficiency in moving dust from air is higher than any other tested air filter."

Then near the bottom of the sheet: "The ability of the filter of the above-entitled application to maintain a high filtering efficiency over an extended range of dust load without exhibiting a rapid increase in static pressure is in [299] applicant's experience entirely unique in the art."

On page 17, in the middle of the page: "Previous to the invention of the air filter of the above-entitled Farr application, all air filters intended to remove dust from air by employing the property of wire mesh to retain dust particles on impingement of the particles there against were constructed with the plane of the wire mesh at right angles to the intended direction of passage of the air through the filter panel."

(Testimony of Richard Spencer Farr.)

On page 20, the middle of the page, where the numbers are marked in quotes, the sentence beginning: "By comparing curve marked '1' with those marked '2,' it will be seen that the air filter of the above-entitled application possesses throughout an extended variation of dust load a high filtering efficiency," and so on.

Then on page 21, the last sentence of the first paragraph: "The result is that a substantial portion of the dust is carried through the filter by large streams of air which are not effectively impinged against the surface of the filter, and accordingly the paper is not effective in removing dust from air."

And in the next paragraph: "Affiant has tested air filter panels employing and constructed with herringbone corrugated paper, the paper employed being Detroit filter paper of a type specially designed for maximum absorption qualities. [300] Such a filter when tested gave the results indicated by the curves marked '3' on the chart, which is 'Exhibit E' to this affidavit."

Then on the top of the next page: "the filter efficiency of a filter construction of paper is markedly below that of filters constructed with wire mesh screen."

Then there are certain statements about the St. Cyr patent in the last paragraph of his affidavit.

There is no foundation, we believe, for any of those statements related in this affidavit and therefore its reproduction in toto is not admissible.



(Testimony of Richard Spencer Farr.)

The Court: On page 16 it appears to me that both of those statements are expressions of opinion of the witness, and they are offered as expert testimony of this witness, is that correct?

Mr. Leonard S. Lyon: That is correct.

The Court: That seems to me to be true of all of the other statements as you have called my attention to them.

Mr. Leonard S. Lyon: I might state, Your Honor, on those matters of opinion, it is not uncommon at all, and it has happened in this district on several occasions in my experience, that the judges have asked that the expert witness, expert affidavit of witnesses as far as they express opinion, that the direct examination be put in affidavit form and read in affidavit form and that counsel be advised of them [301] in advance and that they just come in and cross-examine the witness.

We did that with Judge Bledsoe in a case I know.

Mr. Harris: That was the old equity rules.

Mr. Leonard S. Lyon: It was actually a practice under the old equity rules, that you could make a motion and require that the expert witness' statement of opinion be in affidavit form.

The Court: I suppose you can do it now under pretrial.

Mr. Leonard S. Lyon: I haven't any objection to going through these if Your Honor thinks it is necessary.

The Court: The objection is overruled. I will read the affidavit as I have read Mr. Duncan's affidavit.

(Testimony of Richard Spencer Farr.)

Mr. Baldwin: May there be an exception to the part I read from page 17?

The Court: That is what he said about the other filters?

Mr. Baldwin: About all filters.

The Court: Again that goes to the weight of his testimony. I can decide that whether or not there is a conflict. I have to decide it anyhow. That is what he thinks.

So the objection is overruled.

By Mr. Leonard S. Lyon:

Q. Will you answer the question?

A. If I remember the question right, I was asked if I [302] am still of the same opinion now as I was and so showed in that affidavit. Is that correct?

A. I am asking if you are familiar with each of the statements you made in that affidavit and if you state that each of those statements is true as of your present knowledge and opinion.

A. Yes.

Q. Will you refer to Exhibits 7, F and H?

(The exhibits referred to were passed to the witness.)

By Mr. Leonard S. Lyon:

Q. Are these three specimens of bulletins issued by you as sales aids in promoting the sale of the filters manufactured under the patent in suit?

A. Yes.

Q. Are they representative of a number of other

(Testimony of Richard Spencer Farr.)

issues of the same bulletins? I mean, these are three of a series, are they not?           A. Yes.

Q. About how many different bulletins have you issued since 1940?

A. Probably in the order of 30 or 40 as far as different sheets go.

The Court: Do you want to put them all in?

Mr. Leonard S. Lyon: If counsel for the other side sees any point in it, I will get a specimen of each one of [303] them.

Mr. Harris: I don't see any point in them, Your Honor.

The Court: Very well.

By Mr. Leonard S. Lyon:

Q. Which one of these was the earliest?

A. This bulletin F-161 was the earliest of these three.

Q. Can you give us the period of time during which that bulletin was in current use?

A. Probably that was published in about '40 and used maybe until '41, '42. I don't see any date on this.

Q. When was Exhibit F in current use?

A. That was probably published in '43—no, I am wrong—that might have been a reprint. I don't know exactly the date on this.

Q. Approximately when?

A. Approximately '45, say.

Q. And will you refer to the figure 3 in that bulletin, entitled "Typical Application of Air Filters to Unit Type Equipment," and explain the significance of that figure?

(Testimony of Richard Spencer Farr.)

A. The significance of this illustration here was the very thing that we had to sell in our filter, which was one of the characteristics performances of our filter, where we could operate the unit at higher velocity than was then considered standard. [304]

The practice at that time in applying filters ahead of a coil, for example, was to put a V bank in to get enough filter area to handle the air for the coil.

The Court: Or an increased load of air?

The Witness: Yes, or a slat filter to increase the area, because the coils were operating at around maybe 800 or 600 feet a minute face and then standard filters were around 300 feet a minute face velocity.

So with the filters that were in competition at that time they had to increase the area which these illustrated common methods that were used.

The Court: Staggering them?

The Witness: Yes, to increase the filter area.

And the one on the right where it says "equal area Far-Air filters," is an illustration of how space could be saved and the installation made more compact by using the Farr filter with its unique performance at high air handling capacity in equal area to the coil.

By Mr. Leonard S. Lyon:

Q. Will you refer now to Exhibit 7. Is that your current bulletin being employed at this time?

A. Yes, sir. This bulletin has just recently been published.

(Testimony of Richard Spencer Farr.)

Q. First with respect to Exhibit 7, can you give us in round figures the number of these bulletins that have been [305] sent out to the trade?

A. I don't know whether they have actually been sent out now or they may go out soon. In any event, probably 10,000 to 15,000 have either been mailed out or will be mailed out in the next day or two.

The Court: They go to architects, engineers, designers, construction firms?

The Witness: Yes, Your Honor.

By Mr. Leonard S. Lyon:

Q. And customers such as railroads?

A. Yes.

Q. And airplane companies?      A. Yes.

Q. And like that?

A. Yes, any technical group that have to do with the design and application of air filter banks.

Q. On the inside cover of Exhibit 7 is a list of users of the Far-Air filters. Are those all users of the air filter like Exhibit 2 manufactured under the patent in suit?      A. Yes.

Q. And those are just a few of the names of various companies?

A. Yes. You will note there are no railroads listed in this group at all.

Q. Why is that? [306]

A. Well, we send out a different type of catalog to the railroads and this is more or less for the trade that are the architects and engineers designing stationary ventilation systems such as in this building here.

\* \* \* \* \*



(Testimony of Richard Spencer Farr.)

The Court: Do you make and sell them also for diesel motors?

The Witness: Yes, Your Honor.

The Court: For carburetors on gasoline internal combustion motors?

The Witness: On some large engines we don't make them for the small engines such as a horsepower of 100 for an automobile. Most of our sales are to large horsepower units in the neighborhood of maybe several hundred horsepower up to 2000 horsepower.

The Court: Such as railroad diesels?

The Witness: Yes, Your Honor.

At the present time a good portion of our manufacturing capacity is supplying the diesel locomotive manufacturers with filters for their engines and their air cleaning on their diesel electric units. By Mr. Leonard S. Lyon:

Q. Where used with engines, are they located between the carburetor and the engine?

A. On the diesel engines they are located on the air [307] intake. Most of our modern-day diesels are supercharged and the filter box which holds the filter panel is set on the inlet to the blower which may either be a Roots type blower or a supercharger.

Q. That means that they take air direct from the atmosphere and pass it into the engine system?

A. Yes, sir.

Q. Are your filters adapted for use between a carburetor and the engine to function in conjunction with the gas mixture?

(Testimony of Richard Spencer Farr.)

A. No, we have never made such an application and never considered one.

Q. Would such a device be an air filter of the type we are considering here? A. No.

The Court: It would be a gasoline filter, would it not?

Mr. Leonard S. Lyon: Yes.

The Witness: I don't know what it would be used for there.

By Mr. Leonard S. Lyon:

Q. Now I show you Plaintiff's Exhibit No. 8. Is that a current bulletin that you are issuing to the trade at the present time?

A. Yes. This is another thing that we just published and are sending out to architects and engineers and users [308] all over the United States and Canada.

Q. How many of those have been published?

A. Well, there have been printed and sent out or will be in the next few days a total of 14,000 or 15,000.

Q. And is that a rewrite of earlier bulletins describing your testing methods that you have issued to the trade?

A. This is a summation of our past experience in the development of testing system outlining our present test methods, giving pictures and history on the development, past experience, and of course our present device.

Q. Now in this test method or by this test method that you describe in this bulletin you pro-

(Testimony of Richard Spencer Farr.)

duce curves of the kind that have been shown to the Court here by Mr. Duncan?      A. Yes.

Q. Prior to your going into the filter business or prior to your first attempt at selling of the patented filter, were other manufacturers promoting the sale of their filters by using these comparable curves showing efficiency of their filter and the pressure drop at the filter?

Mr. Baldwin: I object on the ground that there is no foundation. I believe he has testified that from the time he started in with this company in the making of these filters he hasn't shown that he had any knowledge of the time before that as to what other people were doing.

The Court: He is asking him now only about the time he [309] started to make them.

Mr. Baldwin: He has been asked about the time before he started making them and there is no testimony that he knows anything before that time because they have been making them ever since he started to work.

The Court: I thought his question was limited to the time he started.

Mr. Leonard S. Lyon: Yes, when he started. My question is intended to bring this out, whether the use of these kind of curves was something these people have developed or whether he found them already being used when he started in his sales activities.

The Court: The objection is overruled.

The Witness: When I first saw other types of

(Testimony of Richard Spencer Farr.)

published literature on the sale of filters, the curves then generally shown were those illustrated in Graph 3 in Exhibit 7, with this exception, there were no attempts in any of the curves that I ever saw to clarify or classify what type of dust was being used in the test. It was common practice at that time to just show an efficiency curve, a pressure drop curve and state practical dust without any clarification as to what practical dust meant.

One of the purposes of this technical report is to show the effect of the filter performance as tied in to particle size, which is a very important thing in air cleaning. [310]

The Court: Did you introduce anything into literature on the subject, on the matter of disclosing type of dust that you used?

The Witness: In our early stages?

The Court: Yes, or at any time during the course of your business.

The Witness: Yes. Always our practice has been to state what the chemical composition of the dust was and the particle size analysis of the dust. I believe that we are the first company to publish results in that fashion.

The Court: All right.

By Mr. Leonard S. Lyon:

Q. I show you Exhibit No. 2, which is a 20-inch panel of the Farr patented air filter, and call your attention to the fact that impressed on the frame of that filter is the following: "Far-Air Filter, Patent No. 2,286,479. Others Pending. Serial No. 1151, Farr Company, L. A. Cal."

(Testimony of Richard Spencer Farr.)

Have you marked all such panels that have been manufactured like Exhibit 2, with this patent notice? I mean by "manufactured" those manufactured and sold by you since the issuance of the patent in suit.

A. To the best of my knowledge, since we were granted our patent, we started putting the patent number on our filters.

The Court: And you continued to do so? [311]

The Witness: Up to the present time. [312]

\* \* \* \* \*

By Mr. Leonard S. Lyon:

Q. Mr. Farr, you referred to the fact that your company issued a special bulletin to railroad companies. I hand you a copy and ask you if you will identify the same.

The Clerk: Marked, first, No. 18.

(The document referred to was marked Plaintiff's Exhibit No. 18 for identification.)

A. Yes. This is our folder on railroad products.  
By Mr. Leonard S. Lyon:

Q. This is the folder that you distribute to the railroad companies, as a sales aid of your patented filters to the railroad companies? A. Yes.

Mr. Leonard S. Lyon: I will ask that it be received in evidence as Plaintiff's Exhibit No. 18.

The Court: Admitted.

(The document referred to, marked Plaintiff's Exhibit No. 18, was received in evidence.)



(Testimony of Richard Spencer Farr.)

The Court: These designs illustrated are made in the same fashion, except for the change in style and the protecting cover?

The Witness: Yes.

By Mr. Leonard S. Lyon:

Q. Are you familiar with the curves produced by Mr. Duncan, which are on the sheet constituting Plaintiff's Exhibit 11 in this case?

A. Yes, I am.

Q. Attention has been drawn to the fact that the curves for the Farr device and the Air-Maze Type B device are approximately parallel on this exhibit up to a dust load of 500 grams. Attention has been called to the fact that above 500 grams the pressure drop rises abruptly.

Based on your experience in the practical uses of this device, what is the fact or what is the objection, from a practical standpoint, to a filter that, after reaching a certain dust load, rises abruptly in pressure drop?

A. In a ventilating system such as we have here in this court room, the whole system is sized for a given pressure [319] loss, a certain pressure loss for the filter, a certain pressure loss for the heating coils, the cooling coils, the duct work and the outlet registers. After that pressure loss is determined, then a fan is selected to move the desired quantity of air against this pressure loss. That is how we determine how much air is going to come into this room and the temperature of the air.

A rapid change in pressure loss, such as shown

(Testimony of Richard Spencer Farr.)

in this Exhibit 11 on the Type B Air-Maze, after it has picked up about 500 grams of dirt, would materially unbalance such a system, and the detriment in unbalancing such a system means that we do not get the amount of air that this room calls for or was originally designed for, and if we are on a cooling cycle and dropping the air quantity down, due to the sharp increase in resistance, we may drop the temperature of the air where, instead of bringing in maybe 50 degrees for cooling on a hot day, we might drop it down to 45 degrees, which again unbalances the system, and that is the detriment in the ventilating system for this rapid change in pressure loss.

In an engine, such as the applications we make these units for in this Exhibit 18, the detriment there is, an engine burns fuel and air, the oxygen and air in the filter changes materially in pressure loss on an engine intake and can cause a decrease in horsepower due to the fact that the [320] engine does not get enough air to burn with the fuel and develop the horsepower that it is rated for.

In the case of the Diesel engine, not only will it drop off in horsepower but, because the fuel rack setting is fixed, the engine will start to smoke badly due to lack of sufficient combustion air.

In a heating system such as a furnace for a home, a detriment in a rapid change in pressure loss is that that home is usually designed to handle a certain amount of air to carry away the heat that is generated in the fire box. If the filter changes

(Testimony of Richard Spencer Farr.)

rapidly in pressure drop and decreases that amount of air, the fire box overheats, and there has to either be a thermostat where you can shut the thermostat off, or it will actually burn out the fire box due to starvation of air over the heat-transfer surfaces.

In all three of those examples it is very essential that a filter does not have that rapid change in pressure loss, or if one is used that has such a rapid change in pressure loss, that its life is chopped off before it goes to this point where there is a rapid change. [321]

Q. Now it has been suggested or inferred that the pressure drop above 500 grams dust load indicated on Exhibit 11 in the case of the Air-Maze filter would be immaterial because the device would be changed after it had been loaded up to 500 grams. What have you to say as to that?

A. When the filters are serviced the human element enters into that. For example, we in this curve show a dust holding capacity on the Farr filter at 1000 grams. As an example, I have seen diesel electric units come in that have been out on the road where they haven't been able to service them with as much as 14 pounds of dirt on a single 20 x 20 filter.

That is true of many applications, especially on motive equipment where maybe they run into dust storms and can't change them. They have nothing to change them with.

So you can't say that the filter will always be changed at a certain dust holding capacity or a

(Testimony of Richard Spencer Farr.)

certain point. That may be possible in stationary systems, but even that is highly variable in such an installation as we have here.

The Court: In this building?

The Witness: In this building.

The Court: Or a typical building?

The Witness: Yes, because maybe the building engineer says he is going to change filters every 30 days, which his past experience has shown him is correct, but if we have a [322] dust storm, a "Santa Ana," maybe he should go down and change it that very afternoon, and if he doesn't do it, up goes the pressure drop.

Mr. Leonard S. Lyon: You may cross-examine.

### Cross-Examination

By Mr. Baldwin:

Q. Just for the record, Mr. Farr, I would like to state my understanding of the history of the Farr Company as an entity.

It is my understanding that it was originally a partnership, then became a corporation Tempered Air, Inc., and is now the Farr Company, is that correct.      A. Yes.

Q. You mentioned in your direct examination what I believe you called "an early P-5" model of the Air-Maze Corporation product. I call your attention to Defendants' Exhibit A and ask you if that represents the early P-5 you were speaking of.

A. (Examining exhibit) Yes, this is the one I was referring to.

(Testimony of Richard Spencer Farr.)

The Court: That is the abandoned model?

Mr. Baldwin: Yes, sir.

Q. You have stated that you are familiar with the details of the testing procedure used by the Farr Company. That is correct, is it not? [323]

A. Yes, sir.

Q. Do you know the density or weight of your test dust in your composite dust 1543094 in grams per cubic centimeter?

A. Grams per cubic centimeter? That is the same as specific gravity?

Q. There is a difference, but whatever way you know.

A. I know the specific gravity is about 2.5.

Q. Do you know of any other filter manufacturer who is now using the same test dust for testing filter panels which your company uses?

A. I believe the American Air Filter performed some tests with Arizona road dust, or this U. S. standardized test dust.

Q. But they do not regularly test their panels with that dust, do they?

A. No, I don't believe they do.

Q. Do you know of any other?

A. No, I don't believe I can think of any other.

Q. Referring to Plaintiff's Exhibit 8, which is your technical bulletin—I don't think you are going to need one but——

Mr. Leonard S. Lyon: I have one here.

(The exhibit referred to was passed to the witness.)



(Testimony of Richard Spencer Farr.)

The Witness: What figure did you refer to?

Mr. Baldwin: Graph 1. [324]

Q. I think the bulletin is clear, but it is true, is it not, that that test data is made by using your dust No. 1543094?

A. If that is the standard United States Army fine dust—I don't recall the number exactly—but if that is the United States standardized Army fine dust, that is what we refer to in this test.

Q. If you will turn to the second page in front of the one the graph is on, the column headed at the top "Quantitative filter test method with classified dust," and refer to the paragraph beginning in the middle of the page, I think that that identifies it.

A. (Examining exhibit) Yes.

Q. And that is the same dust which was used in Plaintiff's Exhibit 11 which you just looked at a moment ago?

A. Yes.

Q. And Plaintiff's Exhibit 13, which is a comparison, identified by Mr. Duncan and of the P-5 and the Farr filters?

A. Yes.

Q. Referring to Graph 3 on the next page of that bulletin, do you know the specific gravity of the dust used to produce that curve?

A. That is 2.5 again. Actually, the dust used in Graph 3 is a dust that is classified out of the composite dust by means of a Federal classifier. [325]

Q. Yes, I understand.

\* \* \* \* \*

(Testimony of Richard Spencer Farr.)

Q. Your answer meant, as I interpret it, that if the pressure drop should rise suddenly as shown in Plaintiff's Exhibit 11 that that would seriously unbalance the system, is that right?

A. I pointed out, Mr. Baldwin, that a rapid change in pressure loss, such as shown in this curve, could seriously unbalance the system. [326]

I think it should be qualified to this extent, that the magnitude of the pressure drop as compared to the overall pressure loss of the system determines how much unbalance exists.

For example, this system right here might have an overall pressure, static pressure, load of an inch or an inch and a quarter of water. Consequently, three-tenths of an inch or four-tenths of an inch is an important percentage of the overall pressure loss and that would seriously unbalance it.

If we happened to have a system that had an overall pressure loss of 5 inches of water, then a pressure loss difference of one-tenth or two-tenths or three-tenths of an inch might not seriously unbalance that.

Q. Isn't it true, in a building the size of this one, that that overall static pressure is quite considerable with the long ducts?

A. I would judge that this system is operating probably on a total pressure loss of an inch and a half of water, maybe one and three-quarters.

A. And from your knowledge of air conditioning installations, wouldn't you presume that that

(Testimony of Richard Spencer Farr.)

installation was made to accommodate the filter with a .5 inch of water pressure drop?

A. That is entirely up to the designing engineer, Mr. Baldwin. In many cases the engineer allows enough static [327] pressure for maybe just one-tenth or two-tenths of an inch. I think the most common practice is around two-tenths to a quarter of an inch. That of course depends on the selection of the filter that the engineer makes.

Q. It is true, isn't it, that the ASH and VE code adopted in 1933 sets .5 inches of water as the borderline between the low resistance and high resistance filters of this type?

A. I would have to refresh my memory by reading that code to be able to answer that question.

The Court: Of which type? You say "of this type."

Mr. Baldwin: The filter panels intended for general air conditioning units.

The Court: What is the ASH and VE code?

Mr. Baldwin: That is the American Society of Heating and Ventilating Engineers, to which all of these filter manufacturers belong.

The Court: It is a private organization?

Mr. Baldwin: That is correct.

That is all.

Mr. Leonard S. Lyon: That is all, Mr. Farr.

The Court: Step down. [328]

\* \* \* \* \*

(Testimony of Richard Spencer Farr.)

MORRILL SPENCER FARR

called as a witness by and on behalf of the plaintiff, having been first duly sworn, was examined and testified as follows:

The Clerk: State your name in full, please.

The Witness: Morrill, M-o-r-r-i-l-l, Spencer, Farr.

The Clerk: Your address, please?

The Witness: 7120 Arizona Avenue, Los Angeles 45.

Direct Examination

By Mr. Leonard S. Lyon:

Q. You are a brother of Richard Farr, the previous witness in this case?      A. I am.

Q. How old are you, Mr. Farr?

A. Forty-one.

Q. What is your occupation?

A. I am secretary and treasurer and general manager of Farr Company.

Q. The plaintiff in this case?

A. That is correct.

Q. How long have you been connected with the Farr Company?

A. Since the beginning in July, 1937. [333]

Q. Were you one of the organizers of that company?      A. Yes, sir.

Q. When was it organized?

A. July 1, 1937.

Q. How much of a company was it when you started?

(Testimony of Richard Spencer Farr.)

A. The company had rather a meager start. At that time Dad and Dick and myself started into the business with an idea of manufacturing some air conditioning equipment. Neither one of us had had any prior experience in that field or allied fields so that seemed about to be as tough a job as anything else, so we decided to build some units of that type.

For the first two or three years of course most of the time was devoted to test and development to see if we could find something that was satisfactory to bring on the market. As a matter of fact, for the first four years our sales were based—well, they were based almost completely on what sales we got in the evaporative cooling field. That was a pretty seasonal job because in the evaporative cooling field such equipment that is used in the desert regions are installed mostly during the summer season.

The Court: That is these little units you see stuck on top of the buildings?

The Witness: That is right.

The Court: Such as you see in Fresno or Palm Springs?

The Witness: Yes, sir. [334]

In 1939, after we had had some experience with this evaporative cooling, we got the idea of building an air filter based on somewhat the same principle of the cooler.

That was again a case of doing considerable experimental work to determine what we felt was the best design for such an item.



(Testimony of Richard Spencer Farr.)

The year previous to the time that the filter was brought out was spent pretty much in test and development. Our filters were first initiated or started in the market in 1940. Of course that also was a new field to us. We were just barely getting started in the evaporative cooling field and the filter field being new, that likewise like any other product, it takes a lot of work and effort to get anything started. [335]

By Mr. Leonard S. Lyon:

Q. At the time you put out the first of the air filters did you have a factory?

A. Yes. We had a place of business, yes, sir.

Q. How many employees did you have?

A. When we started the cooler business there were just three of us, in 1937. I would say, by the time we started our first filter, that there were possibly five or six of us, back in 1939 and 1940.

Q. Now, you say you brought out the first filters, air filters, in 1940. Was that the filter like Exhibit 2 in this case, the patented filter?

A. That is our standard filter, yes, sir.

Q. And that is the device built under the patent in suit, the first device?      A. That is correct.

Q. And who designed this filter?

A. My father.

Q. That is, Morrill Farr, named in the patent in suit?      A. Correct. [336]

\* \* \* \* \*

The Court: You will stipulate to the assignment in due course?

(Testimony of Richard Spencer Farr.)

Mr. Harris: Yes.

Mr. Leonard S. Lyon: The assignment by Morrill N. Farr to the Farr Company, of which I have the original in my hand, is of the entire right, title, and interest in and to the letters patent in suit and is dated July 14, 1947.

Mr. Harris: We will so stipulate.

\* \* \* \* \*

Mr. Leonard S. Lyon: Will you proceed.

The Witness: Will you state the question again, sir?

(The question referred to was read by the reporter as follows:

“Q. Now, will you give us an outline of what progress you made——”) [337]

By Mr. Leonard S. Lyon:

Q. (Continuing) ——in the sale, promotion, and manufacture of the air filter panel of the patent in suit?

A. Well, starting with the early part of 1940, when we started putting these filters on the market, as I stated, we had approximately five or six employees and perhaps 2500 square feet of floor space. We had depended and were depending at that time largely on the sale of our evaporative cooler for our income. That was true up through the year 1942.

In 1941, not having gotten far in the establishment of our name in the air filter field, we had the choice of trying to divert our sales, or get our sales, perhaps I should say, either from the defense plants

(Testimony of Richard Spencer Farr.)

that were being organized and built at that time, or getting into a completely new industry, because, of course, our evaporative cooler, which was and is made of copper and brass products, was getting to the point, due to the controlled materials plan, where we could not produce any more of those.

As a result, we decided to go after the aircraft engine application. That was becoming a problem at that time, when the airplanes were operating from unsurfaced fields and they were getting so much dust in the engines that the engine life was in some instances practically negligible.

We got approval from Wright Field late in 1941. We were at that time, as I recollect, one of three manufacturers [338] whose products were accepted for that application.

And in 1942 we got our first contracts from the aircraft companies, for the manufacture of such an air filter. At that time we probably had in the neighborhood of 12 or 13 employees and still our 2500 square feet of floor space.

During the war years all of our production was devoted to government work. I say all of it. 95 per cent of it, anyway, the bulk of it, of course, going to the airplane industry, and then the armed forces, the Army, Navy, and Maritime Commission.

We, finally, toward the end of the war, in January of 1945, were awarded an Army-Navy E for our work in the defense effort.

At the time the award was given to us, they made the comment that we were the smallest plant in the

(Testimony of Richard Spencer Farr.)

11 Western States that had received the award up to that time, at which time we had approximaely 40 employees.

Q. Was your only product at that time the patented air filter here in question?

A. That is correct.

Prior to the war period we started doing some test work in connection with the railroads for possible application of our filter.

Durig the war we carried on as much test work as was permissible under the requirements that there were then to [339] divert everything into the war effort.

When the war was about to come to an end, we were fortunate enough to get an order from one of the large railroads to change over all of the filtering equipment on their Diesel locomotives, to replace filters that were then on their locomotives, with our product. Along with this, we had found, in inspecting this field, that there were quite anumber of different sizes of filters and holders for the railroads, and so, when we got into the field, we concluded that we could be of the best service to the railroad industry by standardizing on as few sizes as possible, and we have since that time standardized about three sizes of filters in place of however many they had formerly.

The Court: How many did they have?

The Witness: I don't know how many. Various sizes. There were anywhere from 10 to 30 to 40, I suppose, Your Honor.

(Testimony of Richard Spencer Farr.)

We were very fortunate, indeed, of course, in getting this order from the railroad company to make this changeover, because it enabled us to switch over from war production to civilian production without too much difficulty.

In our year ending 1945, for example, we were perhaps 90 per cent government work, and in the following year we were 90 per cent civilian work. So we were indeed fortunate that we had that contract to tide us over. [340]

During the war period we also, insofar as was possible, endeavored to set up sales representatives throughout the country so that we would have someone to sell our product throughout the United States when the material situation would enable us to do so.

In 1946 we brought out another product which is right alongside the filter. It incorporates the use of our filter, and we made a bid to get into the self-washing filter field, where wire filters are automatically cleaned and re-oiled, which eliminates to a great extent the service problem on air filters.

About that same time we also developed, at the request of one of the railroads, some servicing equipment to handle these panel filters.

It has been mentioned several times in the testimony that fuel filters may need to be cleaned anywhere between three days and three months.

The Court: I thought the witness said "four hours" in packing plants.

The Witness: I shouldn't at all be surprised.



(Testimony of Richard Spencer Farr.)

We were requested to develop washing and oiling equipment that would service these filters.

The Court: In their frames?

The Witness: No. In that case the filters are removed from their holder frames and taken over to be serviced. [341]

The Court: You referred to the automatic washer and oiler.

The Witness: I probably used the wrong terminology. We call it a self-washing filter, which is constructed of a number of these 20 by 20 panels, constructed in a sheet metal frame, and then, through oiling and watering devices, they are controlled through a time clock and automatically cleaned.

The Court: And cleaned in place?

The Witness: And cleaned in place.

The Court: And oiled in place?

The Witness: That is correct.

The Court: Excuse me for interrupting your train of thought.

The Witness: Thank you for clarifying that.

The oiler thing I am referring to is the actual equipment that services your standard fuel filters.

And we brought out some equipment that reduced the cost of servicing and re-oiling filters by approximately 60 to 70 per cent of what costs formerly had been when they were doing it manually.

In 1947 we had gotten fairly well established in the railroad industry and had the good fortune of having a number of the railroads specify our prod-

(Testimony of Richard Spencer Farr.)

ucts with the Diesel locomotive manufacturers and we started to get a fair amount of business from the Diesel locomotive manufacturers. [342]

Our sales continued to grow, having dropped off the two years right after the war, and then resumed again in 1947 and '48.

By Mr. Leonard S. Lyon:

Q. Have you prepared a graph showing, in dollar volume, your sales of the patented air filter involved in this case, by years, commencing in 1940, running through to the 1st of October, 1951?

A. I have, sir.

The Clerk: No. 23.

The Court: No. 23?

Mr. Harris: Do you have a copy of this, Mr. Lyon?

Mr. Leonard S. Lyon: Yes. (Hands document to Mr. Harris.)

I ask that this graph be marked for identification Plaintiff's Exhibit No. 22.

(The document referred to was marked

Plaintiff's' Exhibit No. 22 for identification.)

By Mr. Leonard S. Lyon:

Q. Now, will you explain this graph and what you show by it?

A. Well, on this graph I have plotted the dollar sales volume commencing in 1940 and going through the years, including 1951.

Q. Will you give the totals by years as shown by this graph? [343]

A. I will have to try and do some rapid estimating here.

(Testimony of Richard Spencer Farr.)

In 1940, it was probably about \$500.

In 1941, it was a little more than that.

The Court: Well, each one of these squares represents \$40,000, doesn't it?

The Witness: Yes, each square is \$40,000, Your Honor.

The Court: Well, in 1942, it looks like it would be about \$20,000.

The Witness. About \$20,000.

In 1943, it looks about \$230,000.

In 1944, about \$520,000.

In 1945, \$420,000.

In 1946, about \$440,000.

In 1947, about \$570,000.

In 1948, approximately \$1,090,000 and something.

In 1949, \$1,290,000.

In 1950, \$1,320,000.

And in 1951, in the neighborhood of \$1,800,000.

The Court: That is a calendar year?

The Witness: That is a fiscal year, ending June 30th, Your Honor.

By Mr. Leonard S. Lyon:

Q. Now, as I total this, you have sold, from your first sale in 1940 up to the end of your fiscal year in June, 1951, [344] approximately seven and one-half million dollars worth of the patented filters, is that correct?

A. That is correct. It was slightly in excess of that.

Q. At the present time the plaintiff owns a factory in which these filters are made, is that correct?

(Testimony of Richard Spencer Farr.)

A. We just moved into a new factory. We are not the sole owners of it, Mr. Lyon.

Q. You are the sole occupants?            A. Yes.

Q. That factory is shown on the next to the last page of Exhibit No. 8, is it not?            A. Yes.

Q. How many employees do you now have, engaged in the manufacture of the patented filter?

A. In our total manufacture, which includes some of these evaporative coolers, we have, all told, approximately 150.

Q. And what percentage of your business is in the evaporative coolers?

A. Between 5 and 10 per cent.

Q. Is the rest of it in this patented filter?

A. That is correct.

The Court: I understood your testimony to be that you are gradually getting out of the evaporative cooler business.

The Witness: No, sir. We are doing as much in the [345] evaporative cooler field as we ever have done. As a matter of fact, it is increasing each year, but our filter sales have been going up, of course, at a much greater, rapid rate; and it assumes a smaller proportion.

By Mr. Leonard S. Lyon:

Q. Now, can you tell us in what geographical territory your cooler is actually sold and used, the patented cooler?

A. Our cooler is limited pretty much to the 11 Western States. It is an evaporative cooler.

The Court: Except for the railroads? Are you talking about the evaporative cooler?

(Testimony of Richard Spencer Farr.)

Mr. Leonard S. Lyon: I should not be talking about the cooler. I am interested in the air filter.

Q. Will you answer the question with reference to the air filter?

A. I am sorry. I misunderstood your question.

The Court: He said "cooler."

Mr. Leonard S. Lyon: I made a mistake.

The Witness: The air filter is sold throughout all the states and in approximately 15 or 16 foreign countries.

By Mr. Leonard S. Lyon:

Q. Where do you have sales offices selling the patented air filter?

A. We have sales offices and warehouses in Chicago and [346] New York, and then, of course, we have our manufacturing and sales offices here. Other than those three locations, the filters are handled by manufacturers' agents who are strictly on a commission basis.

Q. Was there any application made for patents in foreign countries corresponding to the application for the patent in suit?

A. We had a patent issued in Canada and in Great Britain.

Q. On this filter? A. That is correct.

Q. I show you what purports to be a patent in Great Britain, No. 646,935, of 1950, which will be Exhibit No. 23.

The Clerk: Plaintiff's Exhibit No. 23.

(The document referred to was marked Plaintiff's Exhibit No. 23 for identification.)



(Testimony of Richard Spencer Farr.)

By Mr. Leonard S. Lyon:

Q. Is this the patent in England to which you have just referred?      A. Yes.

Q. I show you what purports to be Canadian Patent No. 471,516, issued February 13, 1951, which I will ask be marked Exhibit No. 24. Is this the patent to which you have just referred?

(The document referred to was marked Plaintiff's Exhibit No. 24 for identification.)

A. It is.

By Mr. Leonard S. Lyon:

Q. You referred to your cooler that you started to manufacture shortly before the first manufacture of your patented air filter. By whom was that cooler designed?      A. By my father.

Q. Did you apply for a patent on that cooler?

A. Yes.

Q. I show you Patent No. 2,286,480, granted June 16, 1942, to Morrill N. Farr, which I will ask be marked Exhibit No. 25, and ask you if that is the patent issued to your father on the evaporative cooler that you have been referring to in your testimony.      A. That is correct.

(Said document was marked Plaintiff's Exhibit No. 25 for identification.)

Mr. Leonard S. Lyon: You may cross-examine.

\* \* \* \* \*

Mr. Leonard S. Lyon: May the record show that Exhibit 22, the graph of the sales of the patented filter, Exhibit 23, the British patent, Exhibit 24,

(Testimony of Richard Spencer Farr.)

the Canadian patent, and Exhibit 25 the patent on the evaporative cooler, are in evidence, Your Honor?

The Court: Admitted.

(The documents referred to were received in evidence and marked Plaintiff's Exhibits Nos. 22, 23 and 24 and 25 respectively.)

The Court: Did you use the same system of filtering air in the evaporative coolers, the same device?

The Witness: No, they are two different items.

### Cross-Examination

By Mr. Harris:

Q. Mr. Farr, with regard to the sales chart, Exhibit 22, does that include these evaporative coolers as well as filter panels? A. No, sir.

The Court: The answer was no, sir?

The Witness: No, sir.

By Mr. Harris:

Q. Does that include sheet metal work for filter installations other than the filter panels themselves?

A. We don't make filter installations.

Q. Don't you sell brackets and frames for filters?

A. That is correct. That is filters and parts. The [349] graph so states.

Q. Those are not part of the filter?

A. I consider them part of the filters, being holding assemblies for filters.

(Testimony of Richard Spencer Farr.)

Q. They are holding assemblies for filters?

A. That is right. One couldn't be used without the other.

Q. What percentage of these filters is accounted for by such holding assemblies? Twenty-five per cent? Thirty per cent? A. Possibly.

Q. Now are these list figures or are they net figures to the Farr Company? A. Net figures.

Q. You have stated with regard to the evaporative cooler that is shown in Exhibit 25, the '480 patent, that it has some differences with respect to the Farr filter panels shown in the '479 patent in suit.

Will you tell the court what those differences are?

A. Did I state that there were differences?

Q. Well, perhaps I misunderstood you.

The Court: My question was whether or not you used the patent in suit filter in your—well, that is covered by the '480 patent. And your answer I understood to be, no, that they were a different construction. [350]

The Witness: They are two different products.

The Court: That is what he is asking you now. What is the difference?

By Mr. Harris:

Q. What are the differences?

A. The differences are that the cooler is used for lowering the temperature of air in your desert regions and is used for a cooling purpose.

Your air filter, of course, is used to remove dust or foreign particles from your airstream.

(Testimony of Richard Spencer Farr.)

The Court: What is the difference between the air filter and the cooler and the patent in suit? Or do you have an air filter in the cooler?

The Witness: No.

The Court: You do not have an air filter in the cooler?

The Witness: No, sir. They are different products. Sometimes they are used together.

By Mr. Harris:

Q. It is a matter of fact, is it not, Mr. Farr, that the evaporative cooler shown in the '480 patent operates as a very good air filter to remove dust from the air?

A. I don't know the answer to that, sir. [351]

\* \* \* \* \*

Q. Is the same filter media used in the '480 patent as is used in the '479 patent in suit?

A. Screen cloth is used in both of them.

The Court: Is it constructed the same?

The Witness: Generally the same; yes.

By Mr. Harris:

Q. In the '480 patent do you have alternate flat and crimped layers of wire mesh screen?

A. Yes.

The Court: Is the air introduced parallel to them or across the surface of them?

The Witness: Parallel to the sheets of flat corrugated screen.

The Court: The same as is in the patent in suit?

The Witness: That is correct.

By Mr. Harris:

(Testimony of Richard Spencer Farr.)

Q. And the corrugations in the '480 patent are helical [352] corrugations, are they not?

A. That is true.

Q. So that they do bend and change direction from the inlet to the outlet faces?

A. I wouldn't think that they changed direction. They are corrugated at an angle on helical gears.

Q. But when they are wound and assembled in the unit shown in the '480 patent, those corrugations do take a helical path from the inlet to the outlet faces of the filter panel, do they not?

A. In the size of that rotor, it would hardly be described as helical. They are straight through corrugations at an angle.

Q. Can you see through them? A. Yes.

Q. When they are assembled? A. Yes.

Mr. Harris: We don't have one here in court but I think it is unnecessary to produce one.

The Court: Then if I understand it, the difference in structure is the filter in the '480 patent is in the—what do you call it—the Z-shape in the patent in suit, that is, the crimped wire is crimped and then bent in a Z-shape so that the air changes direction or provides a pathway for the air to change direction; whereas in the '480 they are crimped but [353] they are not convoluted or bent.

The Witness: It is a straight through crimp, Your Honor.

The Court: It is a straight through crimp?

The Witness: Yes.



(Testimony of Richard Spencer Farr.)

The Court: It is not a Z crimp?

The Witness: No, sir.

By Mr. Harris:

Q. So would you say that the only difference in construction between the two devices is that in the patent in suit there is a bend in the corrugation, whereas in the '480 patent there is not?

A. Perhaps that is the only difference.

The Court: And the fact that this is made round in circular layers, whereas in the patent in suit they are laid horizontally?

The Witness: In the patent in suit they are shown as horizontal layers.

By Mr. Harris:

Q. However, you make round filters of the same type filter medium as the patent in suit similar to Defendants' Exhibit D, do you not?

A. That is correct.

Q. And that embodies the same filter media as the patent in suit?      A. Yes. [354]

The Court: Then the filter used on the '480 is the same as Defendants' Exhibit D except that the wires are crimped straight across and not in a Z pattern?

The Witness: Yes. And the fact that on the evaporative cooler of course the screen is much deeper corrugations and is wound on a large hub.

Mr. Harris: Now, if the Court please, during the taking of depositions in this action we asked plaintiff's counsel to produce invoices and purchase orders for the first sales of filters of th type shown

(Testimony of Richard Spencer Farr.)

in the '479 patent in suit and also for the first invoices and purchase orders for the cooling devices or humidifiers shown in the '480 patent, which is Exhibit 25.

I have photostats of those here which plaintiff's counsel have provided to us and I wonder if we can't simplify the proof by a stipulation that these do illustrate the first sales of the '479 and '480 devices, the first commercial sales of those devices, which were made on or about the dates shown by invoices and purchase orders which I have.

Mr. Leonard S. Lyon: What are those dates?

Mr. Harris: Well, to identify them a little further and chronologically, the invoices and purchase orders on the '480 patent device, Plaintiff's Exhibit 25, that is, the first one I have here, is dated November 19, 1937, and bears invoice No. 45, being an M. N. Farr and Sons invoice indicating a [355] sale to Safeway Stores at 2522 Sunset Boulevard, Los Angeles.

Then there is a——

Mr. Leonard S. Lyon: Wait a minute.

Is that your invoice for the first sale?

Mr. Harris: This is the '480 patent.

Mr. Leonard S. Lyon: Of the evaporative cooler?

The Witness: Of the rotary as described in that bulletin.

Mr. Leonard S. Lyon: Of the what?

The Witness: I believe the question was of the type of rotor shown in that bulletin.

Mr. Leonard S. Lyon: What bulletin?

The Witness: A bulletin that was presented.

(Testimony of Richard Spencer Farr.)

By Mr. Harris:

Q. It is the type shown in the '480 patent, is it not?       A. Yes.

Mr. Leonard S. Lyon: This is the invoice for the first sale?

Mr. Harris: I had better show the witness these invoices.

Mr. Leonard S. Lyon: Yes. I want to stipulate to whatever I can but I want to be sure we are in accordance with the facts.

(Exhibiting document to the witness.)

The Witness: That is right. [356]

By Mr. Harris:

Q. Now the next——

Mr. Leonard S. Lyon: Wait a minute. What do we do about this first one?

Mr. Harris: Is there a stipulation that that was an actual sale on that date of the '480 device as shown by the invoice?

Mr. Leonard S. Lyon: That is correct.

And is that the first sale?

The Witness: That is correct.

Mr. Leonard S. Lyon: As shown by your books?

The Witness: That is correct.

The Court: That is the first sale of the cooler?

Mr. Leonard S. Lyon: Yes.

The Court: Of the '480 patent?

Mr. Leonard S. Lyon: Yes.

And that was on what date, Mr. Farr?

The Witness: 11-19-37.

(Testimony of Richard Spencer Farr.)

By Mr. Harris:

Q. November 19, 1937? A. Yes.

Mr. Leonard S. Lyon: Now shall we put that in evidence?

The Clerk: Do you want to mark that as an exhibit?

Mr. Harris: I have them all attached together. I will merely identify them and then maybe we can have a stipulation [357] that the documents show the sales.

Mr. Leonard S. Lyon: If the witness says so, I will so stipulate.

By Mr. Harris:

Q. The next invoice is by M. N. Farr & Sons, same type of invoice, to Mohler Bros., dated February 20, 1938, invoice No. 66.

And the next——

A. Am I supposed to be checking as we go along? Go ahead.

Q. The next invoice is No. 84, dated April 30, 1938, indicating sales to J. G. Ridland .

The next invoice is No. 108, dated May 21, 1938, indicating a sale to Electrical Equipment Co.

Mr. Leonard S. Lyon: Wait a minute, Mr. Harris. You are leaving something out. I am not sure but I think some of these sales were a different type of filter medium. I think we wrote you a letter about that.

Mr. Harris: These were all the '480 patent construction. That is what we asked for.

Mr. Leonard S. Lyon: Does the witness know that?

(Testimony of Richard Spencer Farr.)

By Mr. Harris:

Q. Do you know that, Mr. Farr?

A. I was just trying to check against a list here that I made up from that same letter and I kind of got lost there. [358]

Mr. Baldwin: Here is a copy of the letter.

(The document referred to was passed to counsel.)

The Witness: Yes, I think that is correct.

By Mr. Harris:

Q. That is all of those invoices down through No. 108 that I have identified, that is, they are invoices for sales of the evaporative cooler that you have identified?      A. That is correct.

Q. The next document is a purchase order from Electrical Equipment Company, No. 7082, dated May 18, 1938, and that also relates to the last invoice that I have shown you, does it not?

A. That is correct.

Q. The next invoice is No. 131, dated June 14, 1938, indicating a sale to Safeway Stores. Inc. That also refers to the evaporative cooler?

A. That is correct.

Q. The next is a letter from Safeway Stores dated June 1, 1938, to M. N. Farr & Sons, and that relates to the purchase of an evaporative cooler?

A. That is correct.

Q. The next is an invoice No. 145 to Safeway Stores and that indicates a sale of evaporative coolers, does it not?      A. That is correct. [359]



(Testimony of Richard Spencer Farr.)

By Mr. Harris:

Q. The next is a purchase order dated June 29, 1938, from Safeway Stores to M, N. Farr & Sons. That is a purchase order for the last invoice, is it?

A. Yes.

Q. The next is an invoice, No. 146, dated July 25, 1938, also to Safeway Stores, indicating an evaporative cooler sale.

A. Yes.

Q. The next is a purchase order, No. 9520, from Safeway Stores to M. N. Farr & Sons Company, covering the last invoice that I showed you.

A. Correct.

Q. And next is an invoice, 147, indicating a sale of similar equipment to Safeway Stores.

A. Correct.

Q. And last is a purchase order dated June 29, 1938, for the last invoiced equipment?

A. Correct.

Q. Those sales were all ordinary commercial sales, were they?

A. Yes.

Mr. Harris: This group of invoices and purchase orders is offered into evidence as defendants' exhibit next in order.

The Clerk: K.

Mr. Harris: As Exhibit K. [360]

(The documents referred to were marked Defendants' Exhibit K for identification.)

The Court: They all relate to the cooler?

Mr. Harris: Yes.

The Court: And not the patent in suit?

(Testimony of Richard Spencer Farr.)

Mr. Harris: Yes, Your Honor. We shall contend that that is a prior public use of the certain invention of the patent in suit.

Mr. Leonard S. Lyon: If Your Honor please, so that you will have our position in mind when struggling with this: The application for the patent in suit is a continuation of Exhibit 1-B, which was filed July 22, 1939. At that time, the law permitted you to wait two years after the first sale before filing the patent application. So, these sales which were made in November, 1937, it is our opinion, were within the two-year period.

The Court: That is so far as the patent in suit is concerned?

Mr. Leonard S. Lyon: That is correct.

The Court: That is, are you conceding by that statement that the structure used in the cooler is identical with the structure of the patent in suit?

Mr. Leonard S. Lyon: I am not conceding. No; there is the difference in the change in direction, but, even so, we contend that the parent application for the patent in suit [361] was filed within the two-year period of any of these sales, so they do not need to be considered on any question of priority or public sale.

The Court: I think I understand your situation. However, in regard to '480 I understood that the witness said that the air passed over the screen parallel to the surface. It says here, however, "These air passages, however, are not parallel with the direction of flow of the air."

(Testimony of Richard Spencer Farr.)

Mr. Leonard S. Lyon: That is right. [362]

\* \* \* \* \*

The Court: Exhibit K is admitted.

(The documents referred to, marked Defendants' Exhibit K, were received in evidence.)

Mr. Harris: Next, if Your Honor please, I have here a second group of invoices which I do not propose to go through completely. These were supplied to me by counsel for the plaintiff here as indicating invoices and purchase orders for the filter panels for the '479 patent in suit, and I understand that this invoice, dated 3-23-40, March 23, 1940, invoice No. 378, from Temperatair, Incorporated, to Western Thermal Equipment Co., was the first commercial sale of filter panels made in accordance with the '479 patent in suit. Is that correct, Mr. Farr?

The Witness: That is correct.

By Mr. Harris:

Q. And the second document is a purchase order from Western Thermal Equipment Co. to Temperatair, Inc., dated March 15, 1940, and is the order for that first commercial sale made by you under the '479 patent in suit.      A. That is correct.

Mr. Harris: I offer this invoice and purchase order just identified as Defendants' Exhibit L.

The Clerk: Admitted Your Honor?

The Court: Admitted, K and L. [363]

(The documents referred to, marked Defendants' Exhibit L, were received in evidence.)

(Testimony of Richard Spencer Farr.)

Mr. Harris: That is all, Your Honor.

The Court: Is there any redirect?

Redirect Examination

By Mr. Leonard S. Lyon:

Q. Mr. Farr, will you look at Exhibit 25, the patent on the evaporative cooler?

A. May I have a copy of Exhibit 25?

The Court: Yes, Exhibit 25.

Mr. Leonard S. Lyon: Will you hand that copy to the Court.

The Court: I have a copy here of the patent.

By Mr. Leonard S. Lyon:

Q. Referring to Fig. 1 of the drawings, what is the device 14, numbered 14 in that drawing?

A. 14 appears to me as the water reservoir.

Q. In the evaporating coolers as you sold them in 1930, beginning with the first sales, was there such a water reservoir?      A. Yes, sir.

Q. And in the operation of the device, was that reservoir filled with water?      A. Yes.

Q. What effect did that have on anything that was [364] collected by the filter in operation? I mean, if dust was collected by the filter. Strike that all out.

The effect of the wheel passing through that filter, that reservoir, was to wet the wheel?

A. It was to wet the wheel, and any dust that might be collected by the wheel would have the tendency to wash off in the reservoir.

(Testimony of Richard Spencer Farr.)

Q. So, was there any progressive loading of dust in this evaporative cooler such as has been described here as being true of your air filter?

Mr. Harris: Objected to as calling for a conclusion of the witness and no foundation laid, if the Court please.

Mr. Leonard S. Lyon: If the Court please, he may give his opinion.

The Court: He may express his opinion. It is a matter of opinion. Objection overruled.

The Witness: I beg your pardon?

The Court: I just overruled the objection.

The Witness: I interrupted your conversation. I apologize.

I would prefer to leave such questions to some of the expert witnesses.

Mr. Leonard S. Lyon: All right. With that admonition of counsel, we will do so.

The Court: Is that all with this witness? [365]

Mr. Leonard S. Lyon: That is all.

Without my reading the entire deposition of the defendant Gratiot taken in this case, I would like counsel to state whether they will stipulate that the defendant Gratiot was engaged in business, in California, in this district, of the sale of the Air-Maze P-5 filter panels like Exhibit No. 12, immediately prior to and at the time of the filing of the complaint in this action.

Mr. Harris: Yes, we so stipulate.

\* \* \* \* \*



(Testimony of Richard Spencer Farr.)

Mr. Leonard S. Lyon: I would like to read a few pages of the deposition of the defendant Gratiot into the record into evidence.

This is the deposition of Jules D. Gratiot, taken on February 1, 1950, called as a witness in this action, and he testified as follows—the deposition is on file—commencing at line 12, page 14:

“Q. In addition to the correspondence with the Air-Maze Corporation regarding the defense of this suit, have you had any conversations with officers or employees of the corporation regarding this suit? “A. Yes.

“Q. Could you tell us with whom you so conversed? [366]

“A. Yes, Mr. O. H. Schaaf, President of Air-Maze Corporation, also with Mr. W. B. Watterson, Sales Manager of the Air-Maze Corporation.

“Q. How many times have you discussed the matter with Mr. Schaaf?

“A. I would say approximately twice.

“Q. Could you describe the nature of such discussions?

“A. I would say it was in connection with the defense of the matter.

“Q. Did you discuss with Mr. Schaaf the financial aspects of the defense of the case?

“A. Yes.

“Mr. Schuck: You mean who was going to pay the attorneys' fees and costs and things?

“Mr. Lyon Q: That is correct.

“A. That's right.

(Testimony of Richard Spencer Farr.)

“Q. Did you reach any agreement on this matter? “A. Yes.

“Q. Could you tell us what your agreement with Mr. Schaaf is?

“A. The Air-Maze Corporation is going to pay for the costs of the defense, of my defense.

“Q. In other words, the Air-Maze Corporation has agreed to pay the full expenses of the present [367] litigation? “A. Yes.

“Q. Did you discuss with Mr. Schaaf the question of indemnification in the event a judgment is rendered against you personally in this action?

“A. Well, I wouldn't say we discussed it. There was an understanding established regarding that by the corporation.

“Q. What was that understanding?

“A. That they would indemnify any damages resulting therefrom.

“Q. They will pay for you any judgment rendered against you personally? “A. Yes.”

And then I would like to read, commencing at page 19, line 3:

“Mr. Lyon Q: In your conversations with Mr. Schaaf”——

The Court: You left off at line 16, page 15?

Mr. Leonard S. Lyon: Yes.

The Court: Well, isn't the rest of it material?

“Did you discuss with Mr. Schaaf the question of indemnification in the event a judgment”——

Mr. Lyon: I read down to line 2 on page 16.

The Court: Oh, page 16? [368]

(Testimony of Richard Spencer Farr.)

Mr. Leonard S. Lyon: Page 16.

The Court: All right.

Mr. Leonard S. Lyon: Now, I am going to commence reading at line 3, page 19:

“Mr. Lyon Q: In your conversations with Mr. Schaaf and Mr. Watterson of the Air-Maze Corporation relating to the defense of this action was the question of legal representation raised?

“A. Yes.

“Mr. Schuck:”——

Mr. Schuck, I might say, as appears from the deposition, appeared as attorney for the defendants in the taking of the deposition.

“Mr. Schuck: I will stipulate in that connection that it was decided by the Air-Maze Corporation that my firm, Overton, Lyman, Plumb, Prince & Vermille, and now Overton, Plumb, Prince & Vermille, would be the general attorneys in Los Angeles for the defense of both Air-Maze Corporation and Jules D. Gratiot, and that subsequently the firm of Harris, Kiech, Foster & Harris would be associated as special patent counsel in Los Angeles for both defendants, that is in Los Angeles only, and also that those two firms are now attorneys of record for both defendants in this matter. [369]

“Mr. Lyon Q. Did you agree with the representatives of the Air-Maze Corporation that the full control of the defense in this action would be in the hands of the Air-Maze Corporation?

“A. It was never discussed.

“Q. Did you personally retain either of these firms to represent you in this action?

(Testimony of Richard Spencer Farr.)

“A. No.

“Q. They were retained solely by the Air-Maze Corporation? “A. Yes.

“Q. Have you any understanding with either of these firms relating to their responsibility to you alone——

“A. No.

“Q. ——in this action? “A. No.

“Mr. Schuck: Off the record.

“(A discussion was had off the record.)

“Mr. Lyon Q: In so far as you are concerned, the entire defense of this suit, and by that I mean the hiring of attorneys, the control of the progress of the litigation, is the sole responsibility of the Air-Maze Corporation?

“Mr. Schuck: Do you understand the question? We [370] will have it read, if you don't.

“The Witness: Yes, I understand the question. Would you read the question again for me? I say I understand it.

“(The question was read by the reporter.)

“The Witness: Yes.

“Mr. Lyon Q: In other words, have you been told simply that the entire matter would be handled for you by the Air-Maze Corporation?

“A. Yes.”

\* \* \* \* \*

The Court: The plaintiff rests?

Mr. Leonard S. Lyon: Yes, sir. [371]

\* \* \* \* \*

WILLIAM B. WATTERSON

called as a witness by and on behalf of the defendants, having been first duly sworn, was examined and testified as follows:

The Clerk: State your name in full, please.

The Witness: William B. Watterson.

The Clerk: Spell your last name.

The Witness: W-a-t-t-e-r-s-o-n.

The Clerk: And your address, please?

The Witness: 3071 Huntington Road, Shaker Heights, Ohio.

Direct Examination

By Mr. Baldwin:

Q. Will you state your age and your present position and occupation?

A. I am 43 years old, I am vice president of the Air-Maze Corporation in charge of sales.

Q. How long have you occupied your present position? [372]

A. Approximately five years.

Q. What has been your occupation for approximately the last 15 years?

A. For the last 10 years I have been in the Air-Maze sales department.

Prior to that I handled the advertising and sales promotion of several companies in Cleveland, among which was the Air-Maze Corporation.

A. About when did you first start to work with Air-Maze Corporation on advertising and sales of their products?      A. 1936.



(Testimony of William B. Watterson.)

Q. Will you state briefly the history of Air-Maze Corporation and name some of the chief products which it makes and distributes? [373]

\* \* \* \* \*

The Witness: The company was started in 1925 by two men who manufactured air filters under the Greene patent.

By Mr. Baldwin:

Q. Is that the Greene patent, Defendants' Exhibit B, tab 3?

The Court: Is Exhibit B in evidence?

The Clerk: No, Your Honor.

Mr. Harris: I haven't offered any of the defendants' exhibits as yet, Your Honor.

Mr. Baldwin: No. 1,566,088.

The Witness: That is the Greene patent.

By Mr. Baldwin:

Q. Continue, please.

A. The application of the filter was for automobile air intakes——

Mr. Leonard S. Lyon: May my objection stand as applying to all testimony of this witness for which no foundation has been laid as within his knowledge. I think it is obvious he is testifying to matters occurring apparently 10 years before he was connected or had anything to do with the company.

The Court: Overruled, subject to a motion to strike.

The Witness: As the company grew, new products were added until at the present time——

(Testimony of William B. Watterson.)

The Court: What was it doing in 1936 when you went with them?

The Witness: In 1936 they were manufacturing a cylindrical air filter for engines and compressors and panel filters under the Greene patent for air conditioning applications.

By Mr. Baldwin:

Q. What are they making at the present time?

A. At the present time they make seven or eight different types of panel filters, oil bath air filters, pipeline filters, backfire flame arresters, electrolytic precipitators, liquid filters and in-line silencers as well as filter silencers.

Q. Did Air-Maze Corporation have any part in World War II?

A. In World War II we manufactured a very large number of aircraft intake air filters.

We also at that time developed the liquid filter which was used on the airplanes during World War II and is currently used on the jet planes today.

As a matter of fact, that part of our business is the largest segment we have today. [375]

Q. Did Air-Maze Corporation get an Army and Navy E?      A. Yes, we were awarded two.

Q. Is the type P-5 filter panel accused as an infringement here and now marketed by Air-Maze Corporation the only filter panel Air-Maze Corporation ever put out and called Type P-5?

\* \* \* \* \*

The Witness: No.

(Testimony of William B. Watterson.)

By Mr. Baldwin:

Q. What preceded it?

A. We had a panel called the old type P-5 or P-5 obsolete before that. [376]

By Mr. Baldwin:

Q. I show you Defendants' Exhibit A and ask you if that represents the P-5 obsolete type.

A. That is the P-5 obsolete construction.

Mr. Baldwin: Mark this, please.

(The device referred to was marked Defendants' Exhibit M for identification.)

By Mr. Baldwin:

Q. I hand you a small sample of wire screen, marked Defendants' Exhibit M for identification, and ask you if you can identify it.

A. This is the media construction of the P-5 obsolete.

Mr. Baldwin: I offer this in evidence, Your Honor.

The Court: Admitted.

(The device referred to, marked Defendants' Exhibit M, was received in evidence.)

By Mr. Baldwin:

Q. What can you say about the P-5 obsolete as a commercial filter?

A. It was well accepted by the trade and sold in quite satisfactory volume.

Q. What knowledge do you have in the regular course of business as to the characteristics of filter panels sold by your company, and by that I mean resistance, efficiency, and dust-holding capacity?

(Testimony of William B. Watterson.)

A. The sales department regularly receives from the engineering and test development departments of our company performance characteristics, which are curves in graphs, on all our products, as well as those of our competitors.

Q. What can you say about the pressure drop across the P-5 obsolete filter when clean and when dirty?

A. It had a low initial pressure drop and rose very slowly with dirt load.

Q. What can you say about the dirt-holding capacity of the P-5 obsolete filter?

A. It was quite satisfactory, in my opinion.

Q. What can you say about the efficiency of the P-5 obsolete filter?

A. It was quite satisfactory.

Q. During what period of time were the bulk of sales of the P-5 obsolete filter made?

A. From 1943 to 1948.

Q. Approximately how many, if you know, of the Type P-5 obsolete filters were sold by Air-Maze Corporation during that period?

A. I can't tell exactly, because our company records weren't kept in that way. but I estimate that at least 10,000 were sold in the highest year during the period of the production of that filter.

Q. You have stated that the sales of the P-5 obsolete filter ceased about 1948. What did you do then to satisfy the demand for this type of filter panel?

A. We brought out the new P-5 filter.

(Testimony of William B. Watterson.)

Q. I show you Plaintiff's Exhibit No. 12 and ask you if that is the new Type P-5.

A. Yes. That is the new Type P-5.

Q. What was the difference in construction between the old and the new Type P-5 filter?

A. The new Type P-5 filter had a bend in the crimps. Otherwise, it was the same as the P-5 obsolete.

Q. Why did you change from the P-5 obsolete to the new P-5 filter?

A. It was strictly due to sales consideration. With the P-5 obsolete, when the filter was held at an angle, you could see directly through the filter, and that created sales complaints from our sales force in the field.

Q. What proportion of the Air-Maze Corporation business now consists of P-5 panels, as near as you can estimate?

A. I would estimate that it is between 10 and 15 per cent, at the present time, of our panel business and approximately 2 per cent of our total business.

Mr. Baldwin: Mark this, please.

(The device referred to was marked Defendants' Exhibit N for identification.) [379]

By Mr. Baldwin:

Q. I hand you a sample filter and ask you if you can identify Defendants' Exhibit N for identification.

A. Yes, that is Type 50 Detroit air filter.

Q. Is that similar in construction to——



(Testimony of William B. Watterson.)

The Court: The paper one?

By Mr. Baldwin:

Q. (Continuing) —Defendants' Exhibit C?  
Is that similar to Defendants' Exhibit C?

A. It is similar, except that the corrugations are of equal size on that one and have no progressive density as we have here (indicating device). This, I believe, is called Type 25.

Mr. Baldwin: I wonder if I could cut a hole in this one like we did in the other?

The Court: Surely. It is your exhibit. You can do as you please with it.

The Clerk: Do you want to use this knife?

Mr. Baldwin: It is a better knife, I believe.

(Mr. Baldwin cuts hole in device.) [380]

By Mr. Baldwin:

Q. Would you state the direction of the corrugated passages as they go through that filter panel?

A. (Examining exhibit) I would say that they are in the general direction of the air flow.

Q. Is there a bend part way through the panel?

A. There is.

Mr. Baldwin: I offer the sample filter in evidence as Defendants' Exhibit N.

The Court: Well, it has two layers of this treated paper.

Mr. Baldwin: Those two layers are identical. Instead of being smaller corrugations than the other, it is identical.

The Court: Well, these two layers are identical and they are just set so that they reverse direction.

(Testimony of William B. Watterson.)

Mr. Baldwin: Yes.

The Court: In evidence.

(The device referred to was received in evidence and marked Defendants' Exhibit N.)

By Mr. Baldwin:

Q. State who, if you know, makes this Detroit air filter, Defendants' Exhibit N.

A. It has been made since 1932 by the Detroit Air Filter Company and its predecessors in interest, the American [381] Radiator Company. At the present time it is being made and manufactured by the Air-Maze Corporation.

Q. Is it a good filter?

A. In my opinion, it is quite satisfactory.

Q. Could you compare it with the present P-5 as to its characteristics?

A. It has seven to ten points less in efficiency but its pressure drop rise is quite similar in that it is a low pressure drop rise during dirt loading.

Q. There are two numbers stamped in black on Defendants' Exhibit C. I will read them and ask if you can tell what they refer to.

The first number is 2,019,186.

A. That is the Kaiser patent, I believe.

Q. The other number is 2,408,659.

A. That is the Lamb patent.

Q. Can you name any fields for the competitive sale of filter panels where you rarely meet competition from the Farr type filter? [382]

\* \* \* \* \*

(Testimony of William B. Watterson.)

The Witness: Yes. In the aircraft air filter panel field where every velocity over 1500 feet per minute are required, we have a panel that is approved up to around 2000 feet per minute.

Also in the field where filters are required of less than two inch thickness, also in the standard or so-called low velocity fields.

By Mr. Baldwin:

Q. Are those fields which use any considerable number of filters per year?

A. Yes, tens of thousands.

Mr. Baldwin: Will you mark this, please?

The Clerk: Exhibit O for identification.

(The document referred to was marked Defendants' Exhibit O for identification.)

Mr. Baldwin: I am sorry, I do not have multiple copies of this. It is merely the type B panel of Air-Maze.

(Exhibiting document to counsel.)

By Mr. Baldwin:

Q. I hand you a pamphlet marked for identification Defendants' Exhibit O and ask you to identify it, if you can.

A. This folder describes the Air-Maze type B filter panel.

The Court: Type B?

Mr. Baldwin: Yes, like Exhibit 5. [383]

Q. I hand you Plaintiff's Exhibit 5, and ask you if that is also a type B panel such as is advertised in the pamphlet Defendants' Exhibit O.

(Testimony of William B. Watterson.)

A. (Examining exhibit) It is a type B filter panel. It is substantially the same.

Q. What differences are there?

A. Well, we made minor differences in the construction, such as the frame construction and so on, but the media construction is substantially the same.

Mr. Baldwin: Will you mark this, please?

The Clerk: Exhibit P for identification.

(The document referred to was marked Defendants' Exhibit P for identification.)

(Exhibiting document to counsel.)

By Mr. Baldwin:

Q. I hand you a pamphlet marked for identification Defendants' Exhibit P and ask if you can identify it.

A. This is a folder describing the construction of our Kleenflo air filter panel.

Mr. Baldwin: Mr. Reporter, that is spelled K-l-e-e-n-f-l-o, one word.

The Court: Let me see Exhibit O.

(The exhibit referred to was passed to the court.)

Mr. Baldwin: Your Honor, I offer Defendants' Exhibits O and P in evidence. [384]

The Court: Admitted.

(The documents referred to were received in evidence and marked Defendants' Exhibits O and P respectively.)

(Testimony of William B. Watterson.)

By Mr. Baldwin:

Q. Is the Kleenflo type similar to the type B as the arrangement of the filter media?

A. Yes, it is.

Q. Would you say that both the type B filter described in Defendant's Exhibit P and O are of the type where the air flow is in general perpendicular to the screens?

A. Yes.

Q. Does Air-Maze Corporation now sell the type B and Kleenflo type of filter panels?

A. Yes, they do.

The Court: What did you say the Kleenflo was used for, in the high velocity installation? Is that what you said?

The Witness: No, I did not.

The Court: What did you say about it?

The Witness: I said that in general it was similar in construction to the type B filter panel.

The Court: Yes, and the Kleenflo — well, go ahead. Maybe it will develop. I thought he said something I did not catch.

By Mr. Baldwin:

Q. Will you explain the application, the general fields [385] of application, of type B and Kleenflo panels?

A. Both filter panels are used in ventilation systems to filter the dust out of the air.

The Court: Are they used competitively with the plaintiff's products of the patent in suit?

The Witness: I would say that they would be competitive. We sell them against the filter in suit.



(Testimony of William B. Watterson.)

The Court: The same type of installation?

The Witness: The same type of installation.

By Mr. Baldwin:

Q. Would you state the volume of business which Air-Maze Corporation has done in the last year for which you have figures on the type B and Kleenflo panel filters?

A. At the end of our fiscal year of October 31, 1951, we sold approximately a half million dollars of the two filters alone.

Q. Does that figure include filter panels or frames and houses?

A. No, that is just the filter panels or filter cells themselves.

Q. If you added frames and housings, would that add to the figure?

A. That would add substantially to the total dollar volume. [386]

\* \* \* \* \*

Q. Mr. Watterson, do your duties in the Air-Maze Corporation take you into the research and development department of that corporation?

A. Yes. I am there almost every day.

Q. Are you familiar with the test equipment, the test procedure, and the plotting of curves of the data contained in those tests?

A. I am familiar with that procedure.

\* \* \* \* \*

Q. State whether or not you are in position to know the test dusts used by Air-Maze and your principal competitors.

(Testimony of William B. Watterson.)

The Witness: May I have that question repeated?

(The question referred to was read by the reporter as follows:

(“Q. State whether or not you are in position to [389] know the test dusts used by Air-Maze and your principal competitors.”)

A. Yes, I am.

By Mr. Baldwin:

Q. How do you get such information of the industry?

A. Not only as sales manager of Air-Maze, but also as a member of the Technical Advisory Committee of the American Society of Heating and Ventilating, on air cleaning. We are furnished by the manufacturer members of that committee with their various methods of testing air filters and the test dusts that they use.

Q. Will you tell, if you can, what test dusts are being used by Air-Maze and other filter panel manufacturers?

Mr. Leonard S. Lyon: I object to that, as far as “other filter panel manufacturers” are concerned.

The Court: Sustained. Air-Maze is one.

Mr. Baldwin: He has stated, your Honor, that he, as a member of this Technical Advisory Committee, has been furnished with such information.

The Court: Objection sustained.

By Mr. Baldwin:

Q. What does Air-Maze use?

(Testimony of William B. Watterson.)

A. Air-Maze uses two types of test dust. One is what we call the 80-20, which consists of 80 per cent Pocahontas fly ash, to go through a 200-mesh screen, and 20 K-1 lampblack. [390]

The other test is the National Bureau of Standards test dust, which consists of 96 per cent Cottrell precipitate and 4 per cent cotton linters.

Q. Would you explain what the 80 per cent fly ash does, what does that determine or indicate?

A. Pocahontas fly ash.

The Court: Are there different kinds of fly ashes?

The Witness: Well, there could be.

By Mr. Baldwin:

Q. Is this a light or heavy type of ash?

A. It is a relatively light type of ash.

Q. Why do you test with both kinds of dust, one with lint and one without lint?

A. We do that to show the effect of filters when they are placed in locations where a lint is present in the air, because the characteristics of the filter, or, rather, the test results of the filter change.

Q. What effect does the lint have?

A. The lint very substantially increases the resistance of the filter during the test run.

The Court: It makes it dirtier, in other words?

The Witness: It increases the pressure drop very rapidly, because it clogs up, clogs the filter itself.

By Mr. Baldwin:

Q. What knowledge do you have as to the cleaning of [391] filter panels in the field, such as the Air-Maze Type B, Kleenflo, and P-5?

(Testimony of William B. Watterson.)

A. I have reason to be close to that, because several of our distributors either have now or have had cleaning set-ups and I have seen them in operation.

Q. What can you say as to the difficulty of cleaning a Type B Air-Maze panel?

A. They have had no particular difficulty in cleaning the Type B filter.

Q. Have you any evidence in the field that the Type B panel can be cleaned successfully?

A. One of our large customers in the railroad field has used the Type B filter for many years, and they have continued to buy them in large quantities year after year.

The Court: Did they clean them?

The Witness: And they cleaned them. They have reported to us no particular difficulty.

The Court: How often do they clean them, do you know?

The Witness: One railroad that I am thinking of cleans them approximately every three weeks.

The Court: That is, filters on passenger cars?

The Witness: On passenger cars and sleepers.

The Court: Those on the dining car, I suppose, are cleaned more often than the others?

The Witness: Yes. It depends on the dirt load.  
By Mr. Baldwin:

Q. I call your attention to page 36 of the file wrapper, Plaintiff's Exhibit 1-A, and ask you if you have studied and understand what is shown on that page.

(Testimony of William B. Watterson.)

The Court: Page 36?

Mr. Baldwin: 36 of the file wrapper, your Honor.

A. I have studied the graph, yes.

The Court: Is that the graph? Hold it up.

All right.

By Mr. Baldwin:

Q. Have you studied the curves marked "2" on this page 36 of Exhibit 1-A, representing the performance of the Air-Maze Type B panel?

A. Yes, sir, I have.

Q. What comment, if any, have you to make about those curves marked number "2"?

A. I have seen any number of graphs, performance test graphs, on a Type B filter, and I have never seen any that showed as low initial resistance as this does, nor have I seen anywhere the arrestance, as in the curve at the top, that took a downward slope. They invariably will slope upward as the dirt loads up the filter and the efficiency increases.

Q. In your work, in the sale of Air-Maze filter panels, what do you run across as to the pressure drop limits specified for the use of filter panels in commercial and industrial [393] air-conditioning systems?

A. Almost invariably it is a maximum of a half inch of water when the filter is dirty.

Q. Also in the sale of the engine filters, that is, the air intake to engines of the type which is often referred to in the trade as oil-bath filters, what are the limits of the pressure drop or restrictions



(Testimony of William B. Watterson.)

through that type of filter as you meet it in the field?

A. They will vary generally between 6 inches and 16 inches of water. We now have oil-bath filters on engines at the present time that are operating at over 6 inches of water.

The Court: That is, pressure loss?

The Witness: Loss, yes.

The Court: And by that you mean to say an explanation that was given by the first witness?

The Witness: Yes, sir..

By Mr. Baldwin:

Q. Do you in your work, in the sale of Air-Maze filter panels for air-conditioning systems, have any knowledge as to the usual design of commercial and industrial air-conditioning systems, as to the pressure drop which they allow through the filter panels of the system?           A. Yes, sir, I have.

Q. What are the usual conditions as you find them?

A. Generally they permit up to half an inch of water [394] resistance when the filter is dirty.

Mr. Baldwin: Will you mark this, please.

(The document referred to was marked Defendants' Exhibit R for identification.)

By Mr. Baldwin:

Q. I hand you a record marked for identification Defendants' Exhibit R and ask you if that is a record received by you in the regular course of business in your position at Air-Maze Corporation?

A. It is.

(Testimony of William B. Watterson.)

Q. And I ask you whether the record shown on Defendants' Exhibit 9 for identification is a record received by you in your position at Air-Maze, in the regular course of business.      A. It is.

Mr. Baldwin: Your Honor, I offer Exhibits Q and R in evidence under the statute.

Mr. Leonard S. Lyon: I object, your Honor, on the ground there is no foundation laid.

The Court: I don't think there is, counsel. These are records of the company, but there isn't any foundation to show where they got the information or how. It may be that someone just sat down and drew some lines on a piece of paper. I apprehend that, with respect to Exhibit R, the plaintiff Farr will accuse you of that, anyhow, after looking at these lines. [395]

(Conference between counsel.)

By Mr. Baldwin:

Q. Mr. Watterson, these records for identification, Defendant's Exhibits Q and R, state if you know whether or not these were made in the regular operation of the departments of Air-Maze Corporation not for the purposes of this lawsuit but in the regular course of keeping records at the Air-Maze Corporation.      A. That is correct.

Mr. Leonard F. Lyon: I object to that as leading and suggestive, no foundation laid.

The Court: Well, it is leading and suggestive, but that objection is overruled.

There are still records but there is no foundation to show where the data came from or how. They

(Testimony of William B. Watterson.)

might keep records like this in the course of their business, but there is nothing to show that they are true.

By Mr. Baldwin:

Q. Do you know of your own personal knowledge, Mr. Watterson, how and where and by whom these records as shown in Defendants' Exhibits Q and R for identification were made?

A. May I have that question again?

(The question referred to was read by the reporter, as follows: [396])

("Q. Do you know of your own personal knowledge, Mr. Watterson, how and where and by whom these records as shown in Defendants' Exhibits Q and R for identification were made?")

The Witness: Yes, I think that they were made at my request, and they were made in our laboratory by our technicians. The curves were plotted by our assistant chief engineer at my request.

By Mr. Baldwin:

Q. And were you in such personal contact with this that you have knowledge of the truth and veracity of these records?

Mr. Leonard S. Lyon: I object to that as calling for a conclusion of the witness.

The Court: Sustained.

Mr. Leonard S. Lyon: And not a statement of fact.

The Court: Sustained.

(Testimony of William B. Watterson.)

By Mr. Baldwin:

Q. You have stated your work at Air-Maze Corporation took you constantly, I believe you said daily into the department where these records are made, is that right?

A. Almost daily when I am in town.

Q. And you are familiar with the plotting of these graphs of these records?

A. In general, yes. [397]

Q. And these were made by the people who usually make such records for you when you request them?

Mr. Leonard S. Lyon: I object to that; no foundation laid.

Mr. Baldwin: He has stated that he requested them. I am referring to Defendants' Exhibits Q and R for identification.

Mr. Leonard S. Lyon: He didn't say he has seen these records made. I don't know how he knows who made them. He can state what directions he gave, that is all.

The Court: Sustained. Don't you have your engineer here?

Mr. Baldwin: No, not in California, your Honor.

I again offer Defendants' Exhibits Q and R for identification as evidence, your Honor.

Mr. Leonard S. Lyon: Same objection; no foundation laid.

The Court: Objection sustained.

Mr. Baldwin: You may cross examine.

Mr. Leonard S. Lyon: No cross examination.

\* \* \* \* \* [398]

KENNETH F. RUSSELL

called as a witness by and on behalf of the plaintiff herein, having been first duly sworn, was examined and testified as follows:

The Clerk: State your name in full, please.

The Witness: Kenneth F. Russell; R-u-s-s-e-l-l.

The Clerk: And your address?

The Witness: 665 West Tenth Street, Claremont, California.

Direct Examination

By Mr. Harris:

Q. What is your occupation, Mr. Russell?

A. I am general manager and chief engineer of the Vortex Company.

Q. Where is the Vortex Company located?

A. Claremont, California.

Q. How long have you been employed by Vortex Company?

A. I have been employed by Vortex about 22 years.

The Court: V-o-r-t-o-x?

The Witness: V-o-r-t-o-x.

By Mr. Harris:

Q. In general, what type of products does Vortex Company currently make?

A. Vortex Company manufactures air filtering [399] devices of various types, including oil bath air cleaners, panel air filters, separators, breather caps.

Q. How long, to your personal knowledge, has Vortex been in that general line of business?



(Testimony of Kenneth F. Russell.)

A. The Vortex Company has been manufacturing oil bath air cleaners since about 1919 or 1920.

Q. That was before you were with the company?

A. That was before my time.

Q. Since 1929, what type of products have they made?

A. Since 1929 we have been manufacturing oil bath air cleaners and breather caps and since about 1946 we were manufacturing panel air filters.

Q. State briefly the general nature of your duties with the company.

A. Well, as general manager and chief engineer I supervise the production facilities and devote the major portion of my time to the development and also the production, design and tool design for the organization.

Mr. Harris: Will you mark these, please?

The Clerk: Exhibit S.

(The exhibits referred to were marked Defendants' Exhibit S for identification.)

Mr. Harris: I produce a panel type filter sample which I ask to be marked as Defendants' Exhibit S. [400]

The Court: That is a 10-inch square?

Mr. Harris: Yes, your Honor; approximately.

And another one which I ask be marked as Defendants' Exhibit T.

(The device referred to was marked Defendants' Exhibit T for identification.)

(Testimony of Kenneth F. Russell.)

By Mr. Harris:

Q. I show you Defendants' Exhibits S and T, Mr. Russell, and ask you if you are familiar with those products.

A. (Examining exhibits) Exhibit S is a sample or a bottle of the Vortox panel filter called the V-N which is used in normal service.

Q. And what is the one Exhibit T for identification?

A. And the one identified as T is the Vortox panel air filter type V-R, which is used for railroad service primarily.

Q. Are those made in that size or are they made in larger or smaller sizes?

A. No, they are made in all sizes up to approximately 30 x 30.

Q. Do you make any in the 20 x 20 size?

A. Yes, 20 x 20 is the most popular size.

Q. Two inches thick? [401]

A. Two inches thick.

We also manufacture them one inch, two inches, and four inches in thickness. [402]

Q. Why is the corner cut off Exhibit S for identification?

A. Well, the corner has been removed to expose the filter element to prospective purchasers and to see the construction of the unit.

Q. In either of these panel filters, Exhibits S or T, is there any wire screen member which extends generally parallel to the direction of flow of air through the filter? A. No.

(Testimony of Kenneth F. Russell.)

Q. Is there any wire mesh at all in Exhibit T?

A. In T there is no wire mesh of any kind.

The Court: That is expanded metal front and back?

The Witness: Yes.

The Court: Does it have the same depth as this other one except a different gauge wire?

The Witness: The wire is the same diameter, the coils are the same diameter, but there are more of them in it.

The Court: They are more closely compacted in it?

The Witness: Yes.

The Court: And it has expanded metal facing front and back?

The Witness: Yes.

The Court: What do you call this, just coiled wire?

The Witness: Just coiled wire spring. We refer to them as springs quite frequently. [403]

The Court: And packed at random?

The Witness: They are packed at random. They are packed on a machine. And these little springs are fabricated about—well, they run 1200 to 1500 a minute and they run down a chute and go in through a packing mechanism into the filter containers.

The Court: And the difference between the two is that on the S type you have expanded metal facings?

The Witness: That is the face, that is the front face.

(Testimony of Kenneth F. Russell.)

The Court: That is the introduction?

The Witness: Yes.

The Court: And the downstream side, you have one expanded metal on the back and immediately in front of that you have about—what is that, 14 gauge?

The Witness: That is either a 14, somewhere between 14 and 18 mesh.

The Court: Wire screening?

The Witness: Yes.

The Court: And T does not have that?

The Witness: No, it is a reversible unit.

The Court: It has the same wire inside only compressed tight?

The Witness: Slightly more.

The Court: How much by pounds? Do you measure it?

The Witness: We do it by volume. But it amounts to, [404] in a 20 x 20 filter there is approximately three and a half pounds of filter element in the S, and in this T there would be in a 20 x 20, which is a little thicker, about a quarter of an inch thicker, and this will have about four and a half pounds, between four and four and a half pounds.

The Court: An additional pound in the 400 square inches?

The Witness: Yes, sir.

By Mr. Harris:

Q. How long have filter panels of that character shown by Exhibits S and T been made and sold by the Vortex Company?

(Testimony of Kenneth F. Russell.)

A. Well, the panel S in that particular form and that weight and density has been manufactured since about 1946.

The T, the one shown in Exhibit T, has been manufactured since about three years.

Q. With the 20 inch panels in those types, what air capacity are those sold for?

A. We sell them up to 1200 cubic feet for a 20 x 20.

Q. Can you state generally what the efficiency of those panels is?

A. Well, our efficiency size are determined in our own laboratory and there is considerable variation between them.

Let me say this, that the efficiency is competitive and comparable with the units on the market.

The Court: How about the pressure drops?

The Witness: The pressure drops are very similar also. [405]

The Court: Similar to what?

The Witness: To the competitive units on the market such as the Farr or the Air-Maze.

The Court: You mean the Air-Maze P-5 or the other Air-Maze?

The Witness: The Air-Maze P-5.

Mr. Harris: I produce a Vortex catalog which I ask be marked as Defendants' Exhibit U for identification.

(The document referred to was marked Defendants' Exhibit U for identification.)



(Testimony of Kenneth F. Russell.)

By Mr. Harris:

Q. Mr. Russell, is Defendants' Exhibit U a catalog published by the Vortex Company to illustrate its products?

A. This is one of the catalogs that we published; yes.

Q. I call your attention to one of the bulletins found in this catalog which relate to the Vortex type V-R filter, and there is a series of curves on that sheet entitled "Performance Data."

Do you personally have any responsibility for the making of such curves?

A. As chief engineer of course I supervise them. The curves in this particular——

The Court: Do you supervise the tests in which those curves are recorded?

The Witness: The laboratory at Vortex is directly under [406] my supervision.

The tests are supervised by me and the actual collecting of the data is done by the men in the engineering department under my direction.

As to the plotting of the actual curves, no, I didn't plot these curves.

By Mr. Harris:

Q. Are those curves substantially correct to the best of your knowledge as illustrating the performance of that filter?

A. Yes. It is rather a small scale and they are within the limits of the test dust and the apparatus that we use.

Q. What do you mean within the limits?

(Testimony of Kenneth F. Russell.)

A. Oh, in testing filters with relatively fine dust you have a problem of flocculation in the dust.

The Court: What?

The Witness: Flocculation. In other words, the dust has a tendency to gather together in small groups, so that gives you a little variation of perhaps plus or minus two or three per cent.

By Mr. Harris:

Q. Would those curves be illustrative of the operation of the filter panels, Defendants' Exhibits S and T?

A. Yes, those curves would be more of the T; the S would have not quite the same dust holding capacity. The [407] efficiency would be slightly less and the pressure drop slightly less.

Mr. Harris: Exhibits S and T for identification are offered in evidence as Defendants' exhibits of the same number.

Mr. Leonard S. Lyon: Objected to as immaterial and irrelevant. They are not asserted to have been manufactured prior to the patent in suit. They are not part of the prior art.

Mr. Harris: No, certainly not, but there is a claim here that filter panels of the plaintiffs is a very wonderful and marvelous thing. We have some competitive panels that illustrate anybody can make them.

Mr. Leonard S. Lyon: The fact that somebody else might get up some other filters seven years later has nothing to do with it. The defendant doesn't claim it is manufacturing anything like S or T.

(Testimony of Kenneth F. Russell.)

The Court: This will go to the commercial success claimed?

Mr. Harris: Yes.

The Court: How could that effect the commercial success?

Mr. Harris: It disproves the plaintiff's claim here that the plaintiffs by this invention had a very wonderful and novel thing which took the industry by storm and everyone wants to use that and the defendants want to use that.

I think the showing that there are comparable filters—— [408]

The Court: It would not go to that because he said they have not been selling it or how many they have sold or whatever information I may want to use.

Mr. Harris: It isn't to the commercial success, but it goes to the question as to whether or not to make a filter of high velocity and low pressure drop, high efficiency, you have to use this patent in suit, and that is what Mr. Lyon contends you have to do.

We wish to disprove that statement. I think it is certainly material under the allegations made in the opening statement.

Mr. Leonard S. Lyon: I don't think I made quite that statement. I made the statement that this invention taught the art something new, and accomplished results and established standards in this industry that were brand new and unique at the time the invention was made.

(Testimony of Kenneth F. Russell.)

Now seven or eight years later somebody else might have come in and found another way of doing the same thing——

The Court: These were made in 1946, S, and T since about 1948, and the evidence concerning the patent in suit is that they have been making them since 1940. Of course their commercial success began in '41 during the war and continued through subsequently.

Even if the object to be attained is high efficiency and low pressure drop, and S and T both answer the market demands [409] in that respect, how could that affect what the plaintiff claims here was a new and novel method of obtaining high velocity and low pressure drops by the Z element and flowing the air along the flat of the screen rather than through it? [410]

Mr. Harris: It affects the issues in this case solely if the plaintiff contends here, as I think they do, as they lay a foundation to contend later that their filter panel provides some wonderful, marvelous thing that you can't get any other way, and this goes directly to that issue.

The Court: I do not understand that the plaintiff has made that claim. I understand from the evidence and the statements made by Mr. Lyon that the plaintiff claims that it does obtain a high rate of efficiency and low pressure drop by what it claims is a new and novel method. I do not understand them to assert that no other filter obtains that. In fact, one of the witnesses on the stand, Professor

(Testimony of Kenneth F. Russell.)

Duncan, said that there is another method, an electrical method, which is very high, greater in efficiency than these, but it is too expensive to put in.

Mr. Harris: So long as the plaintiff is not going to make that contention, I agree that this is immaterial. If the plaintiff does make it, then, I think that this evidence that we are offering now is material on that question.

Now, if they want to give up that contention, that the Farr patent in suit provides the only, or substantially the only way to make a high-velocity, high-efficiency, low-pressure-drop filter panel, then of course I agree that this is not material. Otherwise, it is material.

The Court: Well, I don't understand from the evidence or [411] remarks of counsel that they claim that that is the only one.

Mr. Harris: I understood they had.

The Court: But they claim a novel way to secure it.

Mr. Harris: I think we will have that statement, your Honor, before the case is done.

The Court: Of course they can argue that in connection with commercial success. In that event, this goes to commercial success, but it is not competent to prove that, because it does not show how many of these have been sold, nor have there been and figures introduced as to the total sales in the United States, for instance, of air filters.

Mr. Harris: None are available, I understand.

The Court: It may well be, on commercial suc-



(Testimony of Kenneth F. Russell.)

cess, that the plaintiff has been highly successful in the matter, but it may be that every other air-conditioner manufacturer has been successful in selling any other kind of a product. I mean comparatively so, from year to year. Anyhow it is time for a recess.

(Short recess.)

Mr. Harris: May we now have a ruling on Exhibits S and T, your Honor?

The Court: Go ahead.

Mr. Lyon: My objection is already of record, your Honor.

The Court: I have been thinking about the testimony of the plaintiff's witnesses in connection with the claimed [412] advantages, cheapness in cost of construction, ease of cleaning and re-oiling, as among the elements going to the commercial success. These may be admissible and may go to that point, although presently there is not any testimony on these two items concerning that, and for that reason I will have to sustain the objection.

By Mr. Harris:

Q. Mr. Russell, how do the panels, Exhibits S and T for identification, compare in cost to the user with Farr and Air-Maze panels?

A. Well, the S unit, which we call our VN, is competitive in price to the Kleenflo of the Air-Maze, and the VR is slightly less, as I recall, than the Farr.

Q. Than the Farr filter here in suit?

(Testimony of Kenneth F. Russell.)

A. So far as price is concerned, they are competitive with the Farr, the VR is competitive with the Farr, and the VN is competitive with the Kleenflo.

Mr. Leonard S. Lyon: I don't know what he means, if the Court please, by "competitive." Are they sold for the same price or are they sold cheaper? They might be competitive because they are sold cheaper.

By Mr. Harris:

Q. What do you mean by that, Mr. Russell?

A. By "competitive" I mean it compares within acceptable limits to the customer. The list price would be probably [413] within less than a dollar, but due to the price structure, the way they change and the variations in discount, it is difficult to say how they compare exactly. I don't know.

Mr. Leonard S. Lyon: If your Honor please, a Chevrolet is competitive with a Cadillac in that sense. It is not clear to me what the witness means by "competitive."

The Court: Well, I suppose that all these air filters, all that are on the market, are competitive with one another. A customer might not want to pay an additional price or he may feel it is better to buy the paper one and throw it away, or he may have some special use for which one type or the other would be more suitable to his purpose. All automobiles, as you say, are competitive to one another, although they are not in the same price range.

(Testimony of Kenneth F. Russell.)

By Mr. Harris:

Q. Well, Mr. Russell, will you state what the list sales price of each of these two types of filters is in a 20 by 20?

A. The type S, or the filter that is designated as S, which is a Vortex VN2, 20 by 20, has a selling price of \$6.25.

The Court: You have your catalog there?

The Witness: I have my own price list.

The Court: Is that the catalog in evidence?

Mr. Harris: No, your Honor, we haven't gotten to this catalog yet. [414]

The Court: I thought you had the catalog marked for identification.

Mr. Harris: It is, your Honor. I will hand it to the clerk.

The Court: Go ahead.

The Witness: The Vortex VR2, which is the same type as illustrated by Exhibit T, has a list price of \$12.40, and if you put handles on it, it would cost you \$13.

By Mr. Harris:

Q. Have you had any experience with the question of cleaning these filter panels illustrated by Exhibits S and T?

A. Yes. We have manufactured a cleaning machine which is in operation in Los Angeles and has been in operation for a number of years. This machine is entirely automatic. A man places a filter on the carrier. It is carried through a washing unit, then it goes through an oiling unit. It is allowed to

(Testimony of Kenneth F. Russell.)

drain and, after that, it is ready to be serviced. In watching that operate, we, of course—this company services all makes of filters, Farr, Air-Maze, American, and Vortex, and it is my opinion that the Vortex services as easily as any of the others. That is, the lint is easily washed out.

Mr. Harris: I renew my offer, your Honor.

Mr. Leonard S. Lyon: The same objection.

The Court: Admitted for that limited purpose. Objection [415] overruled.

The Clerk: S and T?

The Court: Did you say you didn't object or you still object?

Mr. Leonard S. Lyon: The same objection.

The Clerk: That is S and T you are referring to?

Mr. Harris: Yes.

The Court: Yes.

(The devices referred to, marked Defendants' Exhibits S and T were received in evidence.)

\* \* \* \* \* [416]

By Mr. Harris:

Q. Mr. Russell, what technical educational background have you?

A. I graduated from the California Institute of Technology, with the degree of Bachelor of Science in engineering, mechanical engineering.

Q. And when did you graduate?

A. 1929.

Q. Do you belong to any technical societies?

(Testimony of Kenneth F. Russell.)

A. Yes. I belong to the American Society of Mechanical Engineers and, of course, I have the professional license of "Professional Engineer" in the State of California.

Q. Do you personally have any interest whatever in the outcome of this litigation?

A. No. None.

Q. Do you know of any agreement or understanding of any kind between your employer, the Vortex Company, and either of the defendants in this case, relative to the litigation or relative to the outcome of the litigation?

A. No, sir. There is none that I know of.

Q. What experience have you had, if any, with letters patent?

A. Well, in the course of developing the products that we manufacture, applications have been made for patents and a [418] number of patents have been issued in my name, and in following the applications and that procedure, I have become familiar with the rules of the Patent Office to that extent.

Q. Have you read and studied the number '479 patent in suit?      A. Yes, sir, I have.

Q. Do you have that before you?      A. Yes.

Q. Will you state briefly what construction is shown and described in that patent?

A. Well, this is a panel filter that is described in this patent for removing dust from air. It is of a through-passage type. It consists of alternate layers of strips of fly screen or screen material that has been crimped, and the other layer is left flat.



(Testimony of Kenneth F. Russell.)

These layers of material are stacked to form passageways through the filter in the direction of the air flow.

Q. Is there any type of construction described in this specification other than that illustrated in the drawings of the patent in suit?

A. No. I have not found any.

\* \* \* \* \* [419]

Q. I note that Claim 4 of the patent in suit uses the following words:

“said members being constructed and arranged so as to effect a multiple subdivision of the panel in both dimensions perpendicular——”

The Court: Just a moment. That is Claim 4?

Mr. Harris: Claim 4.

The Court: Line what?

Mr. Harris: Starting with line 46.

The Court: Let me catch up with it.

Mr. Harris: “said members being constructed and arranged so as to effect a multiple subdivision of the panel in both dimensions perpendicular to the general direction of flow.”

Q. Mr. Russell, do you find anything in the specification of the patent in suit which defined what is meant by [421] that phraseology of the claim?

A. No, I do not.

Q. Again in Claim 7 in the patent in suit—and I refer you to starting at line 36—it says:

“said passages subdividing a panel in both dimensions perpendicular to the general direction of flow of the medium to be filtered.”

(Testimony of Kenneth F. Russell.)

Do you find any description of discussion in the specification of this patent in suit which defines what is meant by that terminology in that claim?

A. No, I do not.

\* \* \* \* \* [422]

The Court: Do you find anything in the drawings which explains the language in those two claims or illustrates it?

The Witness: I find the drawings that it is illustrated if you assume that the dimensions that are referred to in the claims are the horizontal or the width and the height of the filter. Assuming that that is what they mean by "dimensions," yes, I would say it was illustrated in the patent drawings.

The Court: What about the whole phrase "said members being constructed and arranged so as to effect a multiple subdivision of the panel in both directions perpendicular to the general direction of flow of medium to be filtered, thereby forming passages extending through said filter"? That is Claim 4.

The Witness: In the drawings the construction is such that it would indicate that it would be described by that.

The Court: In other words, with that language in front of you and the specifications and the drawings it takes meaning?

The Witness: It takes a meaning; yes.

By Mr. Harris:

Q. Do you find anything in the specifications or drawings which indicates what the direction of flow of air is relative to this filter panel of the '479 patent?

A. Yes, I do. [423]

(Testimony of Kenneth F. Russell.)

On page 1, column 1, lines 28 to 39 inclusive, it states, in effect, that the air flows along the walls of the passages.

The Court: On lines parallel to the plane or planes of the screen cloth?

The Witness: That is right. It says that on the contrary I have found by arranging the screens in the filter panel to provide paths for the airflow along lines parallel that, roughly speaking, a high filtering efficiency can be effected by this means.

On page 2, column 2, on line 40, the patent describes and indicates that it is necessary for the air to flow through the screens or the screen walls of the passage in order to provide satisfactory efficiency.

By Mr. Harris:

Q. Is that to you consistent or inconsistent with the first statement that you read from page 1, column 1?      A. They are inconsistent.

Q. Now that doesn't quite answer the question I had in mind. I will rephrase it.

As to the direction of flow of the air relative to the face of the panel, and before it gets to the panel in the '479 patent, is there anything in the specification or drawings that would indicate what the direction of flow of the air is relative to the face of the panel? [424]

A. I don't recall of any specific statement to that effect.

\* \* \* \* \*

(Testimony of Kenneth F. Russell.)

Q. Is the air flowing perpendicular to the face of the panel or is it at an acute angle to the face of the panel or is there any description or illustration in this patent in [425] suit as to what the direction of airflow is relating to the face of the panel and before it gets to the panel?

A. I do not recall of any specifically.

Q. I show you Defendants' Exhibit E and call your attention to the small diagram on the back page entitled "Progressive Loading," and ask you if in your opinion that is a correct illustration of the airflow through the Farr panel here in suit.

A. In general, yes, I would say it is.

The Court: Before we get off the subject and before I forget it, a while ago in Claim 7, referring to that clause in line 36, "said passages subdividing panel in both dimensions perpendicular to the general flow of the medium to be filtered," does that clause and phrase take meaning in view of the drawings?

The Witness: Yes, if you consider that the passages are defined by the mesh screening members. If that is what they mean by the passages.

By Mr. Harris:

Q. What type of passages are those, Mr. Russell?

A. In Claim 7?

Q. As shown in the patent in suit.

A. The passages in Claim 7—pardon me—the passages that are shown in the patent in suit and the drawings are completely enclosed from entrance to exit. They are a continuous [426] passage, that

(Testimony of Kenneth F. Russell.)

is, the walls are continuous of gauze or screen material.

Q. Do you have a copy of the book of prior art before you, Mr. Russell, Defendants' Exhibit B?

A. Yes, I do.

Q. Have you carefully studied all of the patents that are included in that exhibit? A. Yes.

Q. Will you refer first to the St. Cyr patent, tab No. 1, and will you describe briefly what is shown and described in that patent?

A. The patent describes a gaseous fuel mixture. This device is cylindrical and is defined to be inserted between the carburetor, that is, the metering jets of a carburetor, and the intake of an engine.

It is shown in Fig. 1 as No. 4.

The Court: Just a moment. Let me find it. Fig. 4?

The Witness: Fig. 1, No. 4, shows the device inserted in the pipe between the carburetor and the engine.

By Mr. Harris:

Q. What is shown in Figs. 3 and 10?

A. Figs. 3 and 10 are two forms of this device and shows how they are fabricated.

Fig. 10 shows the unit which consists of layers of corrugated strips of gauze material with a flat sheet of the [427] same material wrapped into a spiral to form a cylindrical unit shown in Fig. 10.

The corrugated material is shown in Fig. 5 or Fig. 8.

Q. How do those corrugations in those two forms extend with relation to the flow of air?



(Testimony of Kenneth F. Russell.)

A. The corrugations shown in Fig. 5 are at an angle with the edge of the strips and when rolled into a spiral form as shown in Fig. 10 or 3, the corrugations form a helix, take the form of a helix.

Q. Perhaps to better illustrate that we can produce another exhibit, which I ask be marked as Defendants' Exhibit V.

(The document referred to was marked Defendants' Exhibit V for identification.)

(Exhibiting device to counsel.)

By Mr. Harris:

Q. Will you identify Exhibit V for identification to the court?

A. Exhibit V is the general construction of the device of this patent as disclosed in Fig. 10.

Q. And in what direction do the corrugations run when the wire mesh material is wound in a spiral as illustrated in this Exhibit V?

A. They take the helical form.

Q. What is the purpose of the flat layer in that [428] exhibit?

A. The flat layer prevents the alternate layers or the successive layers from nesting. That is the primary purpose of it.

It also adds material.

Mr. Harris: I produce another model which I ask be marked as Defendants' Exhibit W.

(The device referred to was marked Defendants' Exhibit W for identification.)

(Testimony of Kenneth F. Russell.)

The Court: Is this the St. Cyr patent also?

Mr. Harris: That is the St. Cyr too, your Honor.

Q. Will you explain to the court what that Exhibit W illustrates?

A. W illustrates the device as shown in Fig. 3 of the St. Cyr patent.

The Court: Neither 3 nor 10 have any core in this patent, do they?

The Witness: No, your Honor.

The Court: Whereas Exhibit V and Exhibit W both have a core?

The Witness: Substantially they are similar. The core is there to space it.

By Mr. Harris:

Q. So far as the layers of wire mesh are concerned, are they the same as illustrated in the St. Cyr patent? [429]

A. The relationship of the successive layers is the same; yes.

Mr. Leonard S. Lyon: All the way through? Is this a response to your Honor's question about this core, how this core got in here, when it isn't in the patent?

The Court: I do not know what it is in response to. I suppose it is in response to his question. He said that the core is put in here to space it.

The patent drawings in neither Fig. 3 nor Fig. 10 show a core, do they?

The Witness: No, they don't your Honor.

By Mr. Harris:

\* \* \* \* \* [430]

(Testimony of Kenneth F. Russell.)

Q. In these models, Mr. Russell, are they wrapped from the inside out?

The Court: How could they wrap from the inside out?

The Witness: I assume they would be. I don't know how you would do it from the outside in.

The Court: I would not either, but anyway you are an engineer.

The Witness: I don't think I could do it.

By Mr. Harris:

Q. Referring to the construction shown and described in the St. Cyr patent, do those wire mesh members operate as filters?

A. The device, although it is described as a gaseous fuel mixture, on page 1, column 1, line 8 to line 12, it states that the invention is for the purpose of vaporizing liquids.

Then on the same page, column 1, line 30, it states that [431] the fuel is at issues from the jet of the carburetor and is sprayed upon this material, so therefore this material stops the droplets of fuel that are being carried along with the air-stream and in stopping them they obviously are filtering them out of the air.

Q. If there was dust in such flow would it filter the dust out?

Mr. Leonard S. Lyon: I object to that. There is no foundation laid.

The Court: Overruled.

The Witness: In my opinion, they would act as a filter if made as shown in the drawing, either Fig. 3 or Fig. 10.

(Testimony of Kenneth F. Russell.)

By Mr. Harris:

Q. Now as to the corrugations——

Mr. Leonard S. Lyon: Your Honor please, I would like to ask to be heard further on my objection. What is this dust in the gasoline, is it dissolved in the gasoline or what?

Mr. Harris: Let's find out from the witness.

Q. What goes into the filter unit illustrated—I won't characterize it as a filter unit—what goes into the device illustrated in Fig. 2 of the St. Cyr patent?

A. Air from the outside atmosphere goes in, also fuel from the carburetor jets.

Q. And what form is that fuel in?

A. The fuel is in the form of droplets. Of course [432] some will vaporize but there is a large percentage that would not be vaporized.

Q. Now referring to the corrugations illustrated in Figs. 3 and 10 of the St. Cyr patent and also Figs. 4 and 6, when those devices are completely formed, that is, wound in the spiral form as shown there, do the corrugations extend straight through the unit from the inlet to the outlet end?

A. No, not when they are wound.

Q. Can you allustrate that by referring to Exhibits V and W? Point out to the court what you mean by your answer.

A. What I mean is that the direction of this corrugation at this point (illustrating) is in this direction and it obviously changes until it comes out at this point (indicating). So therefore the

(Testimony of Kenneth F. Russell.)

corrugations are not straight through in that sense of the word.

The Court: Well, they are illustrated to be straight through in Fig. 7 in the St. Cyr patent, are they not?

The Witness: In Fig. 7 it shows them with the corrugations formed as in Fig. 8.

The Court: Straight?

The Witness: Straight.

By Mr. Harris:

Q. But how about Fig. 5?

A. Fig. 5 shows them on a diagonal or at an angle with the edge of the strip. [433]

Q. And if they were formed on a diagonal of that character, what would be their form in the finished device?

A. When they were formed they would take the shape or the form that is shown in this model V.

\* \* \* \* \* [434]

By Mr. Harris:

Q. Where does the air come from that goes through the device?

A. The air comes from the atmosphere, goes through the carburetor, through the device, through the manifold and into the engine. In going through the carburetor, the gasoline or fuel, let us say fuel, is sprayed into the air stream. The mixture of droplets of fuel and air then pass through the device, which is a vaporizer, specified as a vaporizer.

The Court: Well, is it intended that air should be sucked in through this, on this machine, that is, before it gets to the carburetor?



(Testimony of Kenneth F. Russell.)

The Witness: No, sir.

The Court: And by this appears to be completely enclosed by Fig. 1?

By Mr. Harris:

Q. Can you clarify that, Mr. Russell?

A. Yes. Let me see if I can find a reference. It states that the device is between the carburetor and engine.

The Court: That is after the fuel has been mixed with the air, is that correct, in the carburetor?

The Witness: Yes, sir.

The Court: Therefore, it has air in it?

The Witness: It has air.

The Court: Go ahead and answer the question. How is it [437] removed?

The Witness: Air would flow through this unit, some along the path formed by the corrugations, and then passes between the corrugations, and some of the air would flow through the screens. The general direction would be primarily coaxial with the unit. As dust that would be carried in the air would impinge upon the screen surfaces, these corrugations near the entrance, as these surfaces became clogged with dust, the air would then be diverted along the passages formed by the corrugations until cleaner——

Mr. Leonard S. Lyon: If your Honor please, I think, so we can understand the witness' testimony, he should point on Fig. 1 to where the air gets into this device at all from the atmosphere. He is talking as if air was going through these screens.

(Testimony of Kenneth F. Russell.)

The Court: It says between the carburetor and the engine.

Mr. Leonard S. Lyon: Yes.

The Court: Now, can't the court take judicial notice of the fact that a carburetor mixes air with gasoline?

Mr. Leonard S. Lyon: That is right [438]

\* \* \* \* \*

The Court: I don't know whether the gasoline would clean the dust as it flows or not. Would it?

The Witness: It would have a tendency, if there was sufficient gasoline that was flowing under this screen, and it must be carried away in the form of liquid, and it would carry the drops of dust with it.

The Court: I mean the droplets of vapor, being sucked into the vaporizer.

The Witness: The droplets of gasoline impinge upon the screen. Then they are spread out and evaporated. They are vaporized as described in the specification. So, therefore, the vapor probably would not carry the dust with it and there would be a certain amount of dust that would be left on the screen.

By Mr. Harris:

Q. Would it or would it not be separated out by the impingement principle? [439]

A. It would be separated. [440]

\* \* \* \* \*

Q. What type of screen member or gauze, or what is this that these elements 4 are made of in this patent?

A. It states, on page 1, column 2, line 100:

(Testimony of Kenneth F. Russell.)

“The body of the device is formed of a strip of wire gauze 4.”

Q. What does that mean to you?

A. Well, gauze is a woven material as I know it, and being wire gauze I would say it was woven out of wire.

Q. Do you have any idea as to what mesh that wire was that was called wire gauze?

A. There isn't any indication as to the mesh, as I recall. [441]

\* \* \* \* \*

Q. In industry in general, Mr. Russell, is a product called “wire gauze” employed?

Mr. Leonard S. Lyon: In general?

A. In general, yes.

The Court: Does it have a commonly understood meaning in the industry, “wire gauze”?

The Witness: Yes. It is a woven material, and it is [442] of the finer size. I would not call a half-mesh wire gauze.

By Mr. Harris:

Q. Well, what mesh size would you include in that?

Mr. Leonard S. Lyon: I object to that as incompetent.

The Court: What he would in the industry generally understand, if he knows, the term of “wire gauze.”

Mr. Harris: Yes, certainly.

A. As we refer to it and as I know it, wire gauze is of the finer wire cloth or the woven material of wire.

(Testimony of Kenneth F. Russell.)

The Court: I still don't know what it is. It is just finer. Finer than what?

The Witness: It would be in the range—it isn't specifically defined. The name "wire gauze" is a term that is a very general term. The specific term is "wire cloth," for instance, industrial wire cloth. People in Detroit manufacture a complete line, going from 200 mesh up to a half mesh, and the wire gauze, as I interpret it, because I know of no definite specifications as to what it is, I interpret it to be somewhere below 14 mesh.

By Mr. Harris:

Q. In this St. Cyr patent, does it include a plurality of wire gauze members extending in the general direction of the intended flow of the medium to be passed through it?

A. In Fig. 10 it shows parallel—it shows numerous passages and they are defined by wire material or wire gauze. [443]

Mr. Leonard S. Lyon: I object to the answer as not responsive to the question. I think the answer to the question is, there is one sheet shown in Fig. 10, one continuous sheet.

The Witness: In Fig. 10 there are two sheets that are shown, so there are multiple sheets.

The Court: Overruled. Objection overruled.

By Mr. Harris:

Q. Now, then, are such wire gauze members constructed and arranged so as to effect a multiple subdivision, a cross-section of the unit in two dimensions perpendicular to the general direction of flow of fluid through the unit?

(Testimony of Kenneth F. Russell.)

A. Depending upon the definition of "two dimensions," but on the general assumption that "two dimensions" means in two directions, yes.

Q. Does that subdivision form passages extending through the St. Cyr element from the inlet to the outlet end?      A. Yes, they do.

Q. Do such passages change in direction?

A. Yes, they do, since they are helical in form.

Q. What is the extent of that change in direction in that St. Cyr device, in those passages?

A. Referring to the drawings of the patent, it indicates that this change of direction is appreciable. The change in direction appears to be somewhere in the neighborhood of [444] 180 degrees.

\* \* \* \* \*

Q. Mr. Russell, will you turn next to tab 2 in Defendants' Exhibit B, which is the Henshaw patent, No. 1,548,839, and describe what is disclosed by that patent?

A. The title of the patent is ventilator. However, the specifications are devoted primarily to the disclosure of a filter. Refer to page 1, column 1, lines 11 to 16.

Q. What sort of a filter is that?

A. The filter disclosed in this patent is of a panel air filter type. It is of the through type and consists of parallel plates as shown in Fig. 2. These parallel plates are formed in the shape of a W and spaced apart to give an air passage, a free air passage, through the unit from the upstream to the downstream side as indicated in the arrow in Fig. 2.



(Testimony of Kenneth F. Russell.)

The plates may be of perforated metal as shown in Fig. [449] 3. The general direction of the airflow, as I have indicated, is from face to face.

The air flows through——

The Court: As indicated by the arrow passing through Fig. 2?

The Witness: Yes, sir.

The Court: And as indicated by the arrows in Fig. 1?

The Witness: Yes, your Honor.

By Mr. Harris:

Q. Does all of the air there go down the passages?

A. No. The patent indicates that the air flows through the plates as well as in the channels.

Q. By "channels" what do you mean?

A. The channels are the spaces indicated as 17, 18 and 19.

The Court: That is, you refer to those as passages, Mr. Harris, do you?

Mr. Harris: The witness referred to them as "channels" and I merely wanted to know what he was referring to.

The Court: You referred to them as passages. You asked him about passages. You said, does the air flow through the passages.

Mr. Harris: Yes.

The Court: And he said it flows through the plates as well as the channels. Are you talking about the same thing? [450]

By Mr. Harris:

(Testimony of Kenneth F. Russell.)

Q. Are we talking about the same thing, Mr. Russell?

A. Yes, I am referring to the passages between the plates.

Q. As the channels? A. As the channels.

The Court: This plate has four faces.

The Witness: It has four sections; yes, sir.

The Court: And the first face or section has holes that are larger than the second, and the third plates, and the second and third plates have holes which are larger than the fourth plate, 1, 2, 3 and 4 being the direction of the flow?

The Witness: That is right, sir.

A number of holes per square inch as indicated in Fig. 3 increases from the upstream side to the downstream and the holes become smaller in each section.

The Court: Now what are those things called 10 in this drawing in Fig. 1? Are they plates also or merely solid baffles?

The Witness: Those are indicated as baffles.

The Court: And what is 11 in Fig. 1?

The Witness: 11, as I recall, describes a wire mesh screen. On page 1, column 1, line 50, "and wire mesh screen 11 positioned in the wall box 12 which constitutes the fresh air inlay of the casing." [451]

The Court: That is just a section there?

The Witness: Yes, sir.

The Court: In other words, there are open places with wire mesh and some with wire mesh, is that it?

(Testimony of Kenneth F. Russell.)

The Witness: Well, I assume that the cross-section in Fig. 1 shows a very enlarged screen. In other words, a large mesh merely to keep out large objects, such as sheets of paper, is my assumption.

The units 10 are described as louvres on page 1, column 1, line 49.

The Court: Very well. [452]

By Mr. Harris:

Q. If the plate 16, the herringbone plate 16, shown in Fig. 2 were made of wire fly screen, would the device operate the same or differently?

A. The operation would be similar. However, I believe the wire mesh could be obtained in sizes that would be more efficient. You are rather limited in the number, in the types and sizes of openings in perforated plates that can be obtained.

Q. Would there be any advantage in using wire fly screen instead of the perforated plates?

Mr. Leonard S. Lyon: I object to that testimony on the ground there is no foundation laid and there is no testimony here that the witness has made any tests with any device built according to this patent. It is pure speculation and pure opinion.

The Court: It is purely opinion. He is testifying as an expert. It goes to the weight of his testimony rather than to its admissibility.

Mr. Leonard S. Lyon: I want to make objection.

The Court: Objection overruled.

Mr. Leonard S. Lyon: It is not based on any experimental evidence.

(Testimony of Kenneth F. Russell.)

The Court: Well, you may ask him on voir dire, if you wish. [453]

Voir Dire Examination

By Mr. Leonard S. Lyon:

Q. Have you ever seen a device built like this device shown in this Henshall patent?

A. As specifically shown in this drawing, no, sir.

Q. You have never tested such a device?

A. No, sir.

The Court: Have you ever tested it with a wire screen?

The Witness: Yes.

The Court: This device?

The Witness: Not this device with the wire screen, no, sir.

The Court: All right.

Direct Examination—(Continued)

The Court: You may answer the question:

In your opinion would it be as efficient with wire screen as with perforated baffle plates?

Mr. Harris: That was not the question, your Honor. I asked if there would be any advantage in using wire screen instead of perforated baffle plates.

Mr. Leonard S. Lyon: I don't see anything wrong with the court's question.

The Court: Well, all right. I thought that is what you were driving at. Leave your question stand and then I will ask him my question. [454]

Mr. Harris: You ask him your question first, your Honor.

(Testimony of Kenneth F. Russell.)

The Court: Go ahead. Answer his question.

The Witness: The question, as I understand it, is: Would there be any advantage in using screen material, cloth material, in place of the perforated metal?

By Mr. Harris:

Q. Yes:

A. I believe there would be, so far as the economics are concerned. At the present time, woven material, wire cloth, is less expensive than is perforated metal.

Q. And that would be the only advantage so far as you see?

A. I don't see any other.

\*\* \* \* \*

Q. Turning next to the Greene patent, tab No. 3, Patent No. 1,566,088, I don't think we need describe that because there has been evidence in regard to that patent.

The Court: I would like to know something about that patent.

Mr. Harris: Very well.

Q. Would you briefly describe that Greene patent, Mr. [455] Russell?

The Court: The think I want to know is the direction of the flow of air. How is it introduced? It isn't indicated here on any of these drawings, although on page 1, column 2, line 90, it states: ". . . in which the dust-carrying gas or air is allowed to pass through a plate or screen approxi-



(Testimony of Kenneth F. Russell.)

mately at right angles to the normal plane of such plate or screen," the "normal plane," I take it, being when it is flat is that correct?

The Witness: That is my understanding, that the air passes through the screens.

By Mr. Harris:

Q. Can you illustrate it?

The Court: In other words, on Fig. 3—let us take one of the others.

The Witness: Fig. 5, sir?

The Court: Let us say Fig. 5. The air would pass at right angles to this diagram, is that right?

The Witness: That is right. It would flow either left to right or right to left.

The Court: It would flow either left or right or right to left, as the diagram shows. It differs, then, from the patent in suit, the flow of air flows from top to bottom or bottom to top in the patent in suit?

The Witness: That is right, your Honor. May I correct [456] that? In Fig. 5 it would flow from front to back, which would be the better indication of the patent in suit, or back to front.

The Court: Well, suppose the top is the back.

The Witness: That would be the same thing.

The Court: All right. And then, of course, the bottom would be the front?

The Witness: Yes, sir.

The Court: On Fig. 8, which way would the air flow?

The Witness: In Fig. 8, the air would flow either

(Testimony of Kenneth F. Russell.)

inward or outward. The action in the center could be either the outlet or the inlet.

The Court: That is, the air would still flow from left to right or right to left, or top to the bottom; it would not flow through?

The Witness: The air would be in the plane of the sheet of paper. The air flow would be in the plane of the sheet of the drawing.

By Mr. Harris:

Q. Will you refer to the Greene patent and can you illustrate to the court, pointing with your pencil, how that flows?

The Court: Well, I will draw an arrow on here. It would flow either this way or that way (indicating)?

The Witness: That is right. [457]

The Court: Yes, this way or that way (indicating), is that correct?

The Witness: That is correct.

The Court: It would flow down?

The Witness: Perpendicular.

By Mr. Harris:

Q. Can we describe that as a radial flow in that figure?

A. Yes, that would be a radial flow.

The Court: Or it might be said the air would flow from outside to the inner circle, or from the inner circle to the outer one?

The Witness: That is right.

The Court: All right.

\* \* \* \* \*

(Testimony of Kenneth F. Russell.)

By Mr. Harris:

Q. Mr. Russell, will you turn to tab No. 4, Patent No. 1,576,121 to Preble, in the prior-art book, and briefly explain that disclosure therein to the court?

A. The disclosure here is a filter unit for filtering [458] particles of dust from gas, described on page 1, column 1, lines 13 to 16.

The unit is shown in cross-section in Fig. 11.

The main filter media is the central portion shown in Fig. 11 and consists of parallel plates of a foraminous material.

The Court: Is that what is called the filtering media, on page 1, line 39, in the patent, where it says, "In one type, the filtering media comprises split wire or mineral wool which, after being assembled in the filter cell, is passed through a special process in which each fibre of the filtering media"—

The Witness: I believe the patent is describing prior art there, your Honor.

The Court: Yes.

The Witness: Just previous to that, it says, "Two types of all-metal filter units have been developed which are non-combustible." The description of the construction——

"The Court: This is "a filtering media of simplified and improved construction," says the inventor, column 2, page 1, lines 55 to 58.

The Witness: In that paragraph, yes, sir.

By Mr. Harris:

Q. Referring to Fig. 11, Mr. Russell, in talking

(Testimony of Kenneth F. Russell.)

about the filtering media, which of the objects shown in that view, [459] the drawing, are the filtering media? I don't think you have given the numbers of them.

A. The main filtering media is described on page 2, column 2, lines 94 to 96, where it states, "The main filtering media within the filter cell comprises a stack 28 (Fig. 11)"—and stack 28 is composed of the parallel sheets 29, 30, and so on, alternately stacked.

The Court: What is the flow of air? Is it from top to bottom?

The Witness: In Fig. 11 they indicate an inlet side and an outlet side, and the air flows from left to right in the patent drawing.

By Mr. Harris:

Q. Now, what does the patent teach that those horizontal sheets may be made of?

A. The patent states on page 1, column 2, lines 87 to 89, that the material is made of foraminous sheets, and it may be of metal or wire mesh screens, or it may also be manufactured of expanded metal.

Q. Are those wire mesh screens flat, or what is their configuration, according to this patent?

A. The patent is not too clear as to the construction of the mesh screens. However, it does indicate that when you fabricate an expanded metal, there may be alternate layers of reinforced rib type construction as shown in Fig. 5 and Fig. 6 and the expanded metal as shown in Fig. 7 with the end view shown in Fig. 8. [460]

(Testimony of Kenneth F. Russell.)

Mr. Leonard S. Lyon: Your Honor please, I don't know—maybe you can follow this—but I am having difficulty. What particular parts of this structure the witness says are made out of expanded material and what part he says are made out of something else, I can't tell.

The Court: Fig. 1 indicates 31. 31 is found in Fig. 11 and is the first sheet vertically placed in the inlet and outlet side.

Fig. 2—I cannot figure that one out.

Fig. 3 is designated as 32, which is found as two sheets going vertically, only one of them on the outlet side and two of them on the inlet side.

Fig. 3, by Fig. 9, appears to be a woven wire screen with two layers on the outlet side in Fig. 11.

30 by Fig 7 is indicated to be—what do you call it, expanded metal?

The Witness: Expanded metal; yes, sir.

The Court: I do not know what 29 is. I do not see 29.

Mr. Leonard S. Lyon: 29 is in Fig. 5. It shows strands of something.

The Court: Yes.

By Mr. Harris:

Q. Now, Mr. Russell, are those sheets or layers 29 and 30, are they flat or are they corrugated or what is their form? [461]

A. On page 2, column 2, line 107 to 111, it indicates that the preferred construction is that the stack 28 is composed of double mesh herringbone expanded metal sheets No. 29 as illustrated in Fig. 5



(Testimony of Kenneth F. Russell.)

and 6, and that the intervening sheets are also of—pardon me—are of corrugated expanded metal and are shown in Fig. 7 and 8 and indicated as No. 30.

Q. Is this filtering unit illustrated and described in the Preble patent of the through type?

The Court: What is through type?

By Mr. Harris:

Q. Will you explain to the court in general what the type of filter is that is described here?

A. In order to differentiate between filters where all of the air must pass through screens, relatively fine orifices, in order to get through the filter and the filters that have bypass openings so that when the filter elements become clogged the air may have a free passage around the screens, that is the type that I have been referring to here as the through type.

The Court: And the Farr is not a through type?

The Witness: It is a through passage type. It has a bypass for the air.

The Court: A through passage type?

The Witness: A through passage type.

The Court: The other is just a through type?

The Witness: The other is a through type.

Mr. Leonard S. Lyon: Wait a minute. It seems to me everything is a through type by this testimony.

By Mr. Harris:

Q. Referring back to the Greene patent, tab 3, is that what you refer to as a through type?

A. No, the Greene patent I would not refer to as a through type.

(Testimony of Kenneth F. Russell.)

Q. Why not?

A. Because the screens are transverse to the air flow and all of the air must flow through the screens.

Q. Whereas in the device of the Preble type all the air need not flow through the screens?

Mr. Leonard S. Lyon: I object to that as leading and suggestive. Look at the screen 33.

The Court: You mean you are objecting to the answer which you anticipate he will give and you are not objecting to the question.

Let us go back to the Greene patent. You say that is not the through type?

The Witness: No, sir.

The Court: The air, you said, had to flow on Fig. 5 from left to right or right to left?

The Witness: Perhaps the word "through" is misleading. However, in order to define between the two types of filters [463] you have the filter where the air may pass around the screens and pass through passages or through openings or through paths where the air may pass from the upstream to the downstream side of the filter without going through a fine mesh screen.

In the Greene type of patent it has to go through the screens.

The Court: Then a through type is not a through type?

The Witness: Yes, sir.

By Mr. Harris:

Q. Now is the Farr panel shown in the '479 patent here in suit, is that a through type?

(Testimony of Kenneth F. Russell.)

A. That is a through type. There are distinct passages to bypass the air from the upstream to the downstream side.

Q. And the Air-Maze P-5 panel, is that a through type?

A. That would be a through type also. There are pathways through there by which the air can go from the downstream to the upstream side.

The Court: Then a through type is one where the air does not have to pass through the screen?

The Witness: Yes, your Honor.

The Court: What is one that does have to pass through the screen?

The Witness: You have me there. How about a transfer screen type? [464]

The Court: I do not.

The Witness: I would suggest that that would be a transfer screen type.

By Mr. Harris:

Q. How about the Henshaw patent, tab 2, is that or is that not a through type filter?

A. That is a through type filter.

Q. Now turning next to——

Mr. Leonard S. Lyon: We haven't got what type the Preble is in view of this screen 31.

The Court: In screen 31 and these other things here, I do not know—well, all right.

The Witness: I am not exactly answering your question but the patent states, on page 1, column 2, line 101 and continues on to page 2, column 1, down to line 11, and it states there that the section is in-

(Testimony of Kenneth F. Russell.)

licated by the screens 31, 32 and 33 on the outlet side and also the inlet side 31 and 32 may be omitted.

By Mr. Harris:

Q. How do those vertical members 31 compare with the expanded metal screens on the front and back of the Air-Maze filter illustrated by Exhibit 12? A. They would be the same.

The Court: How do screens 33 in Fig. 11 of the Preble patent, of which there appear to be three layers of them on [465] the outlet side, compare with any of the material that has been introduced here? Compare with what has been introduced here as 14 mesh wire screen?

The Witness: I would assume that the screens 33 could be fabricated out of 14 mesh screen. They are shown in the drawing in Fig. 9.

The Court: Is there anything in the patent **that** says the size of the opening or the gauge, I guess you would call it, of the mesh?

The Witness: It does describe them as——

Mr. Leonard S. Lyon: Look at line 27 on page 3, column 1, to shorten it up.

Mr. Harris: What is that reference?

Mr. Leonard S. Lyon: Line 27, column 1, page 3.

The Court: Fine wire screens, they are called.

The Witness: Yes, sir.

The Court: Very well.

By Mr. Harris:

Q. Would those fine wire screens 33 perform any substantial filtering function?

(Testimony of Kenneth F. Russell.)

Mr. Leonard S. Lyon: I object to that. There is no foundation laid. I don't know what it is going to be in this device or what isn't going to be in it. The witness has never testified, as far as this testimony goes, that he has ever tested anything in this device. [466]

The Court: You can ask him on voir dire.

### Voir Dire Examination

By Mr. Leonard S. Lyon:

Q. Have you ever seen a filter unit constructed as illustrated in this Preble patent?

A. No, I have not.

Q. Then you have never tested one?

A. No, I have never tested one.

### Direct Examination—(Continued)

By Mr. Harris:

Q. Mr. Russell, referring you back to the Vortex panel filter, which is Exhibit S, I note a fine screen on one side of that. What is the function of that?

A. The function of that is to increase the efficiency a slight amount.

Q. Does that operate in the same way as in the Preble patent?

A. I would assume it would.

Q. Where would the bulk of the filtering take place in the Preble construction as illustrated in Fig. 11?

Mr. Leonard S. Lyon: Same objection; no foundation laid.



(Testimony of Kenneth F. Russell.)

The Court: Same ruling. It is merely his opinion and it goes to the weight of his opinion rather than to its admissibility.

Mr. Leonard S. Lyon: I call your Honor's attention to [467] the fact that in the transcript the question would be in the form as stated and not in the form "have you an opinion" or "what is your opinion."

The Court: The objection is sustained to the form of the question.

By Mr. Harris:

Q. In your opinion, then. I will qualify it to that extent.

A. In my opinion, there would be some filtration take place from the upstream to the downstream depending upon the types of material that are used, and you are given quite a leeway here. You can use either screens or expanded metal or various types of expanded materials.

However, in general I would say that if the filter were properly designed in accordance with this patent the majority of the filtering would take place in section 28.

Q. Now does the patent say anything about how the air goes through the panel, and if so point that out?

A. In general it indicates the inlet and the outlet sides in the drawing Fig. 11.

It also states on page 1, column 2, lines 78 to 82, that the air currents wind back and forth in a zig-zag or undulating manner through the material in the stack 28.

(Testimony of Kenneth F. Russell.)

The Court: What is meant on page 1, column 2, line 95, from there on—let's say about line 93—“and best to employ [468] an alternate series of corrugated and double mesh herringbone expanded metal sheets because of the large number of strands thereof which are bent in all directions, thus exposing enormous aggregate area of sticky surface to the air passing filter.” What is meant by “bent in all directions”?

The Witness: By referring to some of the previous exhibits, expanded metal——

The Court: I know what expanded metal is, but how is it bent in all directions?

The Witness: Well, as it is sheared and then expanded you have surface at various angles, and I interpreted that passage to mean that the expanded metal after it was corrugated even presented more planes upon which the dust could impinge as illustrated in Fig. 8.

Then in the herringbone discussion and a double mesh herringbone expanded metal sheet, line 95, my interpretation is that that is shown in Fig. 5 and Fig. 6.

By Mr. Harris:

Q. Can you point out to the Court anything in this patent which teaches how the dust is removed from the flow beyond what the Court has just read?

\* \* \* \* \* [469]

The Witness: Well, on page 1, column 2, lines 82 to 85, it states that the dust particles are re-

(Testimony of Kenneth F. Russell.)

moved from the air by sudden and repeated changes in direction.

By Mr. Harris:

Q. I refer you to page 2, column 2, line 115 and following. What does that passage mean to you?

\* \* \* \* \* [470]

The Witness: As I interpret it, it merely means that this filter is composed of what you might call numerous elements placed in various directions to cause the dust to impinge upon those surfaces.

By Mr. Harris:

Q. This patent refers to fine wire screen. What would be, in your opinion, the mesh of such a fine wire screen as mentioned here?

A. The patent of course is dated 1925—that is some time ago—but interpreting it in the present time the screen that is generally used in filters of this nature would be in the range of 14 to 18 mesh and, as I recall the wire diameter, it would be in the neighborhood of .011 inches in diameter.

Q. Referring next to the Slauson patent, tab 5, Patent No. 1,729,135, will you briefly describe to the Court the construction illustrated in that patent?

A. The patent describes here an air and oil filter. The description is primarily devoted to the construction of [471] the air filtering element.

Referring to Fig. 1, this air filtering element is shown in the drawing by the corrugated mass inside of the cylindrical unit.

It is fabricated from strips of corrugated and flat material that are wound spirally and the entire

(Testimony of Kenneth F. Russell.)

assembly is then inserted into the cylinder No. 1, Fig. 1.

Q. How does that compare with the disclosure of the St. Cyr patent, to which you earlier referred?

A. The construction would be similar with the exception that the material in the St. Cyr patent is a wire cloth.

Q. What is the material in this Slauson patent?

A. The material used in the Slauson patent is either wool felt or cotton cardboard as described on page 1, column 2, lines 89 to 94.

Q. Where is this air and oil filter shown in the Slauson patent designed for use?

A. The unit is designed primarily for installation on internal combustion engines, air compressors and the like. It is described on page 1, column 1, lines 13 to 14.

Q. Where would that be installed on an internal combustion engine?

A. It would be installed on the air intake to the internal combustion engine or the air compressor.

Q. Where with relation to the carburetor? [472]

A. On an internal combustion engine, if it were a gas or gasoline engine, it would be upstream from the carburetor, that is, ahead of the carburetor.

Q. What is the general direction of flow of air through this device with reference to Fig. 1 of the Slauson patent?

A. Referring to Fig. 1, the air flows in at the top through the screen 16 and out through the tubular connection indicated as 20.

(Testimony of Kenneth F. Russell.)

The Court: No. 7 in Fig. 1, what are they?

The Witness: The combination of oil filter and air filter is that oil is introduced into the channel 5 and, as I interpret the patent, the wall, the inner wall of that angular reservoir No. 4, consists of a filtering material such as felt or cotton cardboard, and the oil, by capillary action flows down the cylindrical wall of the felt material, the absorbent material.

It also of course spreads through the remainder of the unit and coats all of the walls in the filtering element.

Excess oil, due to capillary action, would of course collect at the bottom of the element, the bottom of the filter element, and so they have formed in this particular drawing in Fig. 1 a spiral channel that conducts the oil away from the lower edges of these elements and conducts it into the second reservoir at the bottom of the unit indicated as [473] 8 in Fig. 1.

By Mr. Harris:

Q. Referring to Fig. 5, Mr. Russell, what in general does that illustrate?

A. Fig. 5 shows a form of the filtering material with the corrugations or the crimps of the material at an angle to the edge of the sheet, that is, on a bias.

Q. Is there any teaching in this patent of any other type of corrugation that has been illustrated in Fig. 5?



(Testimony of Kenneth F. Russell.)

A. Yes. They also indicate on Fig 8 the corrugations may be perpendicular to the edge of the sheet. [474]

By Mr. Harris:

Q. And is there any teaching as to any other type of corrugation?

A. Yes. On page 1, column 2, lines 89 to 94, they state that the corrugations may run on a diagonal, they may be spiral, zigzag, or S-shaped, or straight across, as illustrated in Fig. 8. [475]

\* \* \* \* \*

The Court: I did not so understand your question. The objection is overruled. This is just merely the expression of an opinion, now.

You have never constructed this device nor seen it operate?

The Witness: That is right.

\* \* \* \* \*

Q. If this filter element shown in the Slauson patent were made with zigzag corrugations such as you have indicated that the patent teaches, and if it were made of wire screen, [476] fly screen, in your opinion would this filter work the same or differently than the filter element illustrated in the '479 patent in suit?

A. It would, substantially the same.

Q. And comparing that device with the round filter made by the Farr Company, illustrated by Defendants' Exhibit D, what if any difference would there be?

A. It would be the same.

(Testimony of Kenneth F. Russell.)

Q. Turning next to tab 6, which is the Orem patent, No. 1,756,758, will you describe briefly the construction and operation of the device shown therein?

A. This device is an air cleaner, and in its form shown in the patent it is particularly adapted to be attached or be connected to an engine. The device consists of cylindrical filtering elements and a by-pass for the air in the event that the filtering elements become clogged. The unit is shown in Fig. 1.

The air enters through the openings 4 and flows to the carburetor through the tube 7.

The Court: Wait a minute.

By Mr. Harris:

Q. Now, you better take it a little more, in detail, then, so the court can follow the flow of air through this device.

A. In detail, the unit consists of concentric [477] cylindrical filtering elements, as shown.

Q. What number?

A. No. 34, No. 31, No. 26 and No. 18.

Q. Just a moment. Now, how does the air flow?

A. The air flows in through the openings 4, down the passage indicated as D, which is an annular passage, and when the unit is relatively clean, that is, when it is first placed in operation after being cleaned, the air flows through the filter element 34, thence through the passage F and out through the——

The Court: Wait, wait. Here it is.

(Testimony of Kenneth F. Russell.)

A. (Continued) Before it gets to F, it goes through the annular passage 27, thence through F and out through the tube 7.

By Mr. Harris:

K. 27 isn't a passage, I don't think, Mr. Russell. Will you check that?

A. I am sorry. I will correct that. I believe the passage is indicated as 36. It is way up at the top.

Q. Isn't it J?

The Court: Well, down at the bottom it is J, and up at the top it is——

The Witness: What I am referring to is E, down at the bottom, E.

Mr. Harris: Let us look at the bottom, then.

Q. Then, air comes in through the opening 4, down the annular passage D, flows through the filtering element 34, you said?

The Court: At places indicated, at any places indicated by the arrows?

The Witness: By the arrows.

The Court: Is that right, into E, and if it doesn't get through there, it goes up around the top, is that correct?

The Witness: Yes.

The Court: And comes down H?

The Witness: It goes through J. H is an orifice to control the amount of air back pressure, and J is the annular space.

The Court: And it gets out of both through the wire screen back into E and goes out, is that correct?

(Testimony of Kenneth F. Russell.)

The Witness: That is correct.

By Mr. Harris:

Q. What happens if the outer filter element 34 becomes clogged with dirt or dust?

A. As described in the patent, when the screens 34 or the filtering element 34 becomes clogged, then the air by-passes to the next screen, 31, and then, as successive screens are clogged, it finally flows through the opening C and out through to the carburetor by a free path.

The Court: Where? [479]

The Witness: Through the cylinder 7.

The Court: How does it get to 7 from passage K?

The Witness: It flows through at the upper right hand side, the orifice, into the chamber indicated as 22, thence it flows through the cylindrical chamber out through the opening 20.

The Court: That is F.

The Witness: And thence, when all the screens are dirty, the final path will be through the annular passages and finally down through the central tubular passageway indicated as L, as indicated by L, then through the opening 20 and out through the tube 7.

The Court: All right.

The Witness: This action is described briefly on page 1, column 1, lines 10 to 27 inclusive. It is described in detail on page 2, column 1, line 49, and finishes in column 2, at line 102.

By Mr. Harris:

(Testimony of Kenneth F. Russell.)

Q. Now, is this or is this not a through type filter such as you have referred to?

A. Yes, it is.

Q. And what is the primary purpose of this device, the construction of it, as stated in that patent?

A. The primary purpose of the device is to filter air, to remove dust from the air that is entering the carburetor [480] of an engine.

Q. In what manner?

A. By filtering through the filtering elements that were described.

The Court: By passing through the holes in the screen?

The Witness: The filtering element in this patent——

The Court: Or passing along the surface of the screen, which?

The Witness: The air is filtered, first, by passing through the screens, and then, as described on page 1, column 1, lines 22 to 27, it states that the air is baffled and the dust is removed in that manner, so that the air flows first through the screens and then along the filtering material.

By Mr. Harris:

Q. And what effect would that have on dust removal?

The Court: In your opinion.

The Witness: Which part of the operation?

By Mr. Harris:

Q. The latter part, the second part.



(Testimony of Kenneth F. Russell.)

A. It would have some cleaning effect.

The Court: Well, a baffle is generally understood to be a solid material, isn't it?

The Witness: Quite often it is, yes, your Honor.

The Court: Have you ever heard of a baffle plate that isn't? [481]

The Witness: Throughout the prior art, these older patents quite often refer to baffles and then go on to state that these baffles may be made of screen material, as I recall. It is rather loosely used.

The Court: Did you ever construct this device?

The Witness: No, I did not.

By Mr. Harris:

Q. Referring next to tab 7, which is the Merryweather patent, No. 1,841,250, will you briefly describe the construction illustrated there?

A. The patent is titled "Furnace." However, on page 1, column 1, lines 1 to 7, it states that the object is to provide a filter in combination with the furnace. The filter referred to throughout the patent is shown in Fig. 3 as 21.

Q. What is Fig. 2?

A. And Fig. 2 shows the unit by itself, separate. In the Fig. 1, this same unit is shown as 21.

Q. All right. Now, how is that filter unit made up?

A. This unit is described as being parallel sheets of material placed at an angle to the air flow, as shown in Fig. 2 and Fig. 3.

Q. What is that material from which those sheets are made up?

(Testimony of Kenneth F. Russell.)

A. The patent describes the material as wire gauze or screens. [482]

The Court: Where?

The Witness: On page 2, column 1, lines 24 to 26.

Mr. Harris: That just says "wire gauze."

The Witness: "While the baffle plates 23 may be constructed of any suitable material, I prefer to construct the same of wire gauze \* \* \*" Then later he refers to it.

By Mr. Harris:

Q. Where?

A. Page 2, column 1, lines 17 to 20. [483]

\* \* \* \* \*

The Witness: Then, previous to that, he states, on page 2, column 1, line 17 through line 21, "The rectangular frame is provided with a plurality of vertically positioned rectangular baffle screens 23 \* \* \*"

Q. Now, I call your attention to page 2, column 1, lines 39 to 41. Does that cast any light on this?

A. I am sorry. Yes, it does. This also gives a brief operation of the unit. It states that "The baffle screens are arranged in a position where a large amount of air will flow through the wire screens 23. A large amount of dirt, dust or lint carried by the air and not precipitated in the drawer 18 will be lodged in the screens 23."

Q. Does this patent or does it not use the terms "wire gauze" and "wire screen" interchangeably?

A. Yes, it does. [484]

\* \* \* \* \*

(Testimony of Kenneth F. Russell.)

Q. Now, Mr. Russell, will you describe the operation of the device illustrated in the Merryweather patent as it is stated in the patent itself?

A. The air flows through the passageway in Fig. 3 and approaches the filter perpendicular to the face in the general direction——

Q. Just a moment. What is the direction of air flow in general?

The Court: In Fig. 1 it would be from right to left.

The Witness: It would be from right to left as indicated by the arrows. That is the general flow, upstream and downstream of the filter.

In Fig. 3 it would be approximately through the screens parallel to the general direction of flow.

The Court: And by “through” you mean through in the same sense that you have previously said, that it does not flow through the meshes, it flows through the meshes and along and athwart?

The Witness: I am afraid I have been confusing on that. The direction of air would be parallel to the general direction of the flow and would pass through the interstices of the screens.

The Court: It would have to pass through the interstices of the screen? [486]

The Witness: When the screens were clean a large portion would go through the screen and a small portion might go down through the passages. By Mr. Harris:

Q. Now where in the patent do you find any description of that operation?

(Testimony of Kenneth F. Russell.)

A. On page 2, column 1, lines 34 to 44 inclusive, it states that the air will flow through the interstices of the screen 23 and it describes in brief the operation of the unit there.

Q. What reference was that, Mr. Russell?

A. Page 2, column 1, lines 34 to 44.

Q. Then referring you to column 2 on page 2, line 79 and following, what does that teach you?

A. On page 2, column 2, it teaches that the arrangement of the plates are such that as the dust accumulates on the screens where it would have to fill the interstices and when they become entirely filled with dust or other matter, then the air can pass along the screens to where, by the baffling device, it will not seriously interfere with the ordinary passage of air. And that is described in lines 79 to 87.

Q. In your opinion, what would be the progression of dust accumulation on the screens in the Merryweather patent?

A. In my opinion, the dust would accumulate on the [487] entrance portions of the screen or the upstream half and as these become loaded with dirt the airflow would be directed along the screens until it found fresh openings and then would pass through the screens.

Q. And in your opinion what effect would the accumulation of dust or dirt on the screens in that device have upon the pressure drop through the device?

A. They should have very little effect.

(Testimony of Kenneth F. Russell.)

Q. Referring next to tab 8, which is the Kaiser patent, No. 2,019,186, will you briefly describe what is illustrated there?

The Court: This Kaiser patent, was there not one of the exhibits produced here on that?

Mr. Harris: Maybe we could simplify that. I will withdraw the question and ask you this, Mr. Russell:

Q. I show you Defendants' Exhibit N and ask you if that bears any relation to this Kaiser patent we have referred to.

A. (Examining exhibit): The Exhibit N is similar to the construction shown in Fig. 5 except considering the scale to which the drawing Fig. 5 was made, the space between the two sections appears to be somewhat larger in the exhibit than is indicated on Fig. 5.

Q. You mean it is larger in the sample filter Exhibit N than it is in Fig. 5 of the Kaiser patent? [488]      A: That is right.

The Court: Let me see it. Exhibit N is the one that has the same size openings on both sides?

The Witness: Yes.

The Court: There was another one here that had large openings on one side and smaller on the other as in Fig. 7.

Mr. Harris: Yes, Your Honor.

Mr. Baldwin: That is Exhibit C.

Mr. Harris: That is Defendants' Exhibit C, which I hand to the Court.

The Court: Is this not one also, No. 16? These are the same, are they not?



(Testimony of Kenneth F. Russell.)

Mr. Harris: Substantially.

Q. I will show you Plaintiff's Exhibit 16 and Defendants' Exhibit C and ask you if they are as illustrated, in your opinion, in the Kaiser patent.

A. (Examining exhibits) Referring to Exhibit C, the unit appears to have smaller corrugations on one side than the other. This is illustrated in Fig. 7 of the patent.

However, in Fig. 7 or in any of the figures, I do not notice any reinforcing members or wood members as shown in Exhibit C.

The Court: Are there not wood members also in Exhibit 16 and N?

The Witness: In Exhibit N we only have a cross-sectional [489] opening in the center. Yes, Your Honor, in Exhibit N there are some stiffening members inserted into the mesh at the edge of the unit.

By Mr. Harris:

Q. What do you mean by the "mesh"?

A. Pardon me, inserted into the material, the corrugated material.

Q. So far as the filtering media is concerned, that is found in those three exhibits, Defendants' Exhibits C and N and Plaintiff's Exhibit 16, is that substantially as illustrated in the Kaiser patent?

A. Yes, they are substantially the same.

Q. Referring next to tab 9, which is the Manning patent, No. 2,079,297—

The Court: Just a moment. Where in the text of the specifications does it provide for the direc-

(Testimony of Kenneth F. Russell.)

tion of the airflow—I see, page 1, column 1. Is that the only one?

The Witness: There is another reference on page 1, column 1, line 29 to 32, which shows that the passageways are at an angle to the face of the body.

The Court: Very well. [490]

By Mr. Harris:

Q. Let us turn next to the Manning patent, tab No. 9, Patent No. 2,079,297. Will you briefly describe the construction illustrated in that patent?

A. The unit described here is a filter of the panel filter type. It is a construction similar to that of the Kaiser patent, and the filter element consists of two sections as shown in Fig. 2.

Q. Numbered what?

A. Numbered 15 and 15, 13 and 14, and so on. The two sections, these sections individually, are constructed of parallel layers of corrugated and flat material. The two sections are assembled into a frame, No. 12 of Fig. 2, and they are spaced apart by the reinforcing member 16, which the patent states is to be of expanded material.

The Court: Expanded material?

The Witness: Yes, sir.

By Mr. Harris:

Q. What is the direction of air flow through that device, considering the view, Fig. 2?

A. The air approaches the filter normal to the face and then flows through the passages, depositing dust upon the walls of the filter.

(Testimony of Kenneth F. Russell.)

The Court: Would the air flow be from right to left or from left to right on Fig. 2? [491]

The Witness: In Fig. 2 the air flow could be either right to left or left to right.

The Court: Where is the detail of 16 described?

The Witness: On page 1, column 2, the reference on lines 19 and 20.

The Court: “\* \* \* and stiffening means.”

The Witness: “\* \* \* and stiffening means.”

Then, on Fig. 6, the unit 16 is shown in detail, which is a very enlarged type of expanded metal material.

Mr. Harris: Does Your Honor see the stiffening means 16 in Fig. 6, that is illustrated there? Perhaps Mr. Russell could point that out to the Court.

The Court: I see, yes. Expanded metal or a similar material. It has very large orifices.

The Witness: Yes, these orifices, the size of the orifices is indicated on Fig. 6 on the next page.

The Court: On Fig. 6. I have Fig. 6.

The Witness: Fig. 6, yes, sir.

By Mr. Harris:

Q. What are the alternate corrugated and flat strips or sheets of material 18 and 19 made of, as described in this patent?

A. On page 1, column 2, lines 35 to 40, they are described as paper, flexible and absorbent material.

Q. In your opinion, if these strips 18 and 19, the [492] alternate corrugated and flat strips, were made of wire fly screen, how would the operation of this filter compare with the filter illustrated and described in the '470 patent in suit?

(Testimony of Kenneth F. Russell.)

Mr. Leonard S. Lyon: That is objected to as irrelevant.

The Court: Objection overruled.

A. The operation would be similar.

The Court: Would the result be the same, in your opinion?

The Witness: The result would be substantially the same. It would depend upon tests to determine how close the opening between——

Mr. Leonard S. Lyon: If Your Honor please, I don't think your question or the witness' answer indicates——

The Court: He says it depends upon tests.

Mr. Leonard S. Lyon: Yes, but I don't think it indicates whether the results would be the same as if the Manning patent were using paper or whether the results would be same as in the Farr device. I think that is a very critical thing.

The Court: Well, I suppose this would be made of the same material that the Farr device uses.

Mr. Leonard S. Lyon: Now, the question is, would the results be the same as the results of what, the Farr device or the Manning device with the paper? [493]

The Court: As the Farr. As the Farr.

Mr. Leonard S. Lyon: I wanted that clear. It was not clear in the answer.

The Court: You don't know, is that your answer?

The Witness: I don't know definitely, no.

The Court: You said it would be the same, depending upon tests?

(Testimony of Kenneth F. Russell.)

The Witness: Depending upon tests. The spacing between the two would probably increase the restriction very slightly. However, the efficiency might also be increased, due to that operation.

By Mr. Harris:

Q. What is your opinion on that question?

Mr. Leonard S. Lyon: I don't think his opinion would be any good if he does not know.

Mr. Harris: I think his opinion would be helpful.

The Court: I thought he just got through expressing his opinion that it would be dependent upon factors which he does not know. Is that correct?

Now let me ask you this question: Assuming that the Manning device were made of wire screen material such as used in the Farr patent, do you have an opinion as to whether or not the results would be the same or better or worse than if the Manning patent were made of the material described in the patent? That calls for yes or no. Do you have an opinion? [494] If you have no opinion, say "No," and that is the end of it.

The Witness: Yes, I have an opinion.

The Court: All right. What is your opinion?

The Witness: As I understand the question—May I have the question again?

(The question referred to was read by the reporter as follows:

("Assuming that the Manning device were made of wire screen material such as used in the Farr patent, do you have an opinion as



(Testimony of Kenneth F. Russell.)

to whether or not the results would be the same or better or worse than if the Manning patent were made of the material described in the patent?")

The Court: Do you understand that?

The Witness: Yes, I do.

The Court: That is, the Manning patent follows the specifications and drawings—I mean would follow the specifications and drawings of the Manning patent, only substituting the material of the Farr.

The Witness: My opinion would be that the efficiency would be slightly higher and the restriction might be slightly higher—would be slightly higher.

The Court: The restriction, the pressure loss?

The Witness: The pressure drop through the filter would be slightly higher. [495]

By Mr. Harris:

Q. Now, in which one would it be slightly higher?

A. The efficiency would be slightly higher in the Manning filter if it were constructed as shown, but with the corrugated members, fly screen members of the Farr filter substituted. The restriction would also be very slightly higher, in my opinion.

The Court: The restriction?

The Witness: The pressure drop through the filter would also be slightly higher.

The Court: In other words, it would clog up quicker?

(Testimony of Kenneth F. Russell.)

The Witness: No, Your Honor. The spacing apart would introduce additional turbulence in the region between the elements 15 and 15, where the expanded metal stiffener is located, and that turbulence would introduce a slightly higher pressure drop when the filter were clean.

By Mr. Harris:

Q. Well, now, by "slightly higher," can you give us any quantitative estimate of that?

A. That would be difficult to say.

The Court: Without experiments?

The Witness: Without testing it.

The Court: Have you ever made this device?

The Witness: No, sir. I never made it.

The Court: With either paper or the Farr material? [496]

The Witness: No, Your Honor.

The Court: Have you ever seen it?

The Witness: No, Your Honor. I have never seen this particular type.

The Court: All right.

Mr. Harris: Does Your Honor have any questions further on this Manning construction?

The Court: Not at the moment.

By Mr. Harris:

Q. Proceeding next, Mr. Russell, to tab No. 10, which is the Farr Patent No. 2,286,480, will you describe generally to the Court what is illustrated in this construction?

A. The patent discloses "Air Purifier or Conditioner." On page 1, column 1, lines 2 and 3, it

(Testimony of Kenneth F. Russell.)

states, "the function of which is to remove dust or impurities from air."

Q. How is the filter constructed in this?

A. The unit is a rotary type unit. The filter element of this unit is constructed of strips of corrugated and flat material, spirally wound, as in Fig. 4, about a cylindrical unit 5, a base 5.

Q. What is the direction or orientation of the corrugations relative to the axis of the unit?

A. In Fig. 1 the corrugations are shown to be at an angle, or on a helical form, as shown in Fig. 1.

Q. What is the direction of air flow through this [497] device?

A. As shown in Fig. 1, the air flow approaching the unit is from right to left and, as described in the patent on page 2, column 1, lines 1 to 7 inclusive, the air flow is through the screens.

Q. Is all of the air flow through the screens or does some pass down the corrugations?

A. It states that a certain amount will pass down the corrugations but it states on page 2, column 1, that the screens, the passages "are inclined to the direction of flow, so that while they do deflect to a certain extent the air currents passing through them, a large portion of the air will, by its own momentum, tend to move through the purifier element in a straight line."

Q. Will you compare the device illustrated in Fig. 1 of that patent with the Farr round filter, Defendants' Exhibit D, which I hand you.

A. From an examination of Exhibit D, if the

(Testimony of Kenneth F. Russell.)

filter element in this exhibit were wrapped on a core as it is in Fig. 4, this core shown as No. 5, I would say the construction was the same.

Q. Well, are those corrugations straight through in the Farr '480 patent, or are there any herringbone—

A. In the Exhibit D, it is difficult to see whether there is a herringbone crimp in the unit or not. You cannot [498] see.

The Court: It was testified that there was.

The Witness: Then, there is.

The Court: That there was.

By Mr. Harris:

Q. Other than that?

A. Other than the herringbone—other than the bend in direction in the corrugations and the absence of the core, the device would be similar in construction.

Mr. Harris: I produce a sample of filter media which I ask be marked as Defendants' Exhibit X for identification.

(The device referred to was marked Defendants' Exhibit X for identification.) [499]

By Mr. Harris:

Q. I show you Defendants' Exhibit X for identification and ask you how that compares with the filter media shown in the Farr '480 patent.

A. (Examining exhibit) If the material in the Exhibit X were wrapped in the form of a spiral the construction would be the same as in the patent '480.

(Testimony of Kenneth F. Russell.)

Q. Can you bend that sample into a rough circular form?      A. Yes, I can.

Q. Now when you bend it so are the passages or corrugations straight through the device?

A. No, the corrugations take a helical form.

Mr. Leonard S. Lyon: Your Honor please, it is not clear to me what the witness means by his answer.

Mr. Harris: Counsel can cross-examine him.

Mr. Leonard S. Lyon: I notice three separate sheets of the corrugated material and two separate sheets of the flat material. Is the witness testifying there are five separate sheets altogether in Fig. 4 of Patent '480?

Mr. Harris: We will ask him.

Q. Will you respond to counsel's question? [500]

\* \* \* \* \*

The Witness: No, the intention of the testimony was that if the material as shown in Exhibit X, which consists of alternate layers of flat and crimped screen material, were formed to a spiral form as shown in Fig. 4, the construction would be the same.

By Mr. Harris:

Q. And if they were so formed, would there be a change in direction of the corrugations from one side to the other of the panel?

A. Yes, since they would take a helical form there would be a change in direction.

Q. How does that compare with the construction illustrated in the St. Cyr patent, which is tab No. 1 in Defendants' Exhibit B?



(Testimony of Kenneth F. Russell.)

A. Do you mean the material in Exhibit X?

Q. No, the construction illustrated in this Farr patent, No. '480.

The Court: Exhibit D?

Mr. Harris: No, Your Honor. I think that is the patent in suit. Farr Patent '480 is tab No. 10.

Q. How would the construction of the filter media illustrated there compare with the unit illustrated in the St. Cyr patent? [501]

A. The construction would be similar with the exception that in the '480 patent there is a solid center and in the St. Cyr patent, '237, the spiral is starting at the axis. Otherwise they would be the same. [502]

\* \* \* \* \*

Q. Mr. Russell, referring back to the Farr '480 patent, which is tab 10 in Defendants' Exhibit C, do you have that before you?      A. Yes, sir.

Q. Does that patent disclose or does it not disclose the filtering panel operating on the principle of impingement of particles on collecting surfaces?

A. Yes, it does.

Q. Does it disclose such a panel which includes a plurality of mesh screening members extending in the general direction of the intended flow of the medium to be filtered?      A. Yes.

Q. Are such members constructed and arranged so as to effect a multiple subdivision of the panel in both dimensions perpendicular to the general direction of flow of the medium to be filtered?

A. Yes. [504]

(Testimony of Kenneth F. Russell.)

Q. Do such members form passages extending throughout the filter?      A. Yes.

Q. Are the tunnels of those passages composed of the mesh members?      A. Yes.

Q. Do the passages change direction?

A. Yes.

Q. And in that construction is it arranged so that the medium, the air flow through it, may flow through the mesh of the members near the entrance of the panel when the filter is clean?

A. Yes.

Q. And partially through the passages and thence through the mesh of the members located progressively toward the exit of the panel, as the panel becomes progressively loaded with particles?

A. Yes.

Q. In the '480 patent, are the mesh screen members which you have referred to constructed and arranged to form passages extending through the panel of relatively large size as compared to the openings in the mesh members?      A. Yes.

Q. And do such passages subdivide the panel in both dimensions perpendicular to the general direction of flow of [505] the medium to be filtered?

A. Yes.

Q. Now, referring to tab 11 of the Defendants' Exhibit C, which is the Wood Patent No. 2,252,242—

The Court: Well, before you get to that, on the Farr patent—

Mr. Harris: Yes, Your Honor.

(Testimony of Kenneth F. Russell.)

The Court: On this Farr patent '480, suppose or assume that the embodiment of the Farr patent in suit, as illustrated by Exhibit No.— What is the exhibit number?

Mr. Leonard S. Lyon: Exhibit 2.

The Court: Is this the Farr? No. 4, is this it?

Mr. Harris: Exhibit 2, Your Honor.

The Court: All right. Suppose that Exhibit 2 were used in an air duct to which was introduced water, would the result be the same, by the use of Exhibit 2, as it would by the use of the apparatus exemplified in '480?

The Witness: Do you mean if this device were substituted for the filter in the '480?

The Court: Yes.

The Witness: (Continuing) Would it work the same as described in the '480 patent?

The Court: Would the result be the same, that is to say, would it take out the water from the air as well as the impurities? [506]

The Witness: Yes.

The Court: The result would be the same?

The Witness: It would be substantially the same, yes.

The Court: And how would you do that?

The Witness: In rectangular section?

The Court: In this air filter, Exhibit 2.

The Witness: As I understand the question, I would take that type of construction and form it into a spiral and wrap it around the collar 5.

The Court: No, no. You just install this in an

(Testimony of Kenneth F. Russell.)

area 20 by 20, where you flow air through it, and water.

The Witness: Well, so far as the air going through it, the cleaning out would be the same. Now, so far as the water is concerned, it would depend on how the water was introduced. If the water was sprayed on the surface with a nozzle or something like that, sprayed on it, if the spraying were very heavy and the velocity were high, you might carry some droplets of water on through.

Is that what you mean, sir?

The Court: It isn't what I mean. I am asking you.

The Witness: I mean, does that answer the question?

The Court: It is your answer?

The Witness: Yes.

The Court: Well, one of the objects of this '480 patent is stated to be "to provide an apparatus which will be [507] efficient in operation but which is so constructed as to prevent air-borne drops or particles of water from being carried along into the air stream that is being purified."

The Witness: Yes, it would filter out droplets of water provided the quantity of water was not excessive or it completely flooded it and went on through.

The Court: Well, on the patent in suit, if you desired to embody this into an apparatus which was designed for cleaning air by the filtering method and by the introduction of water, how in the patent

(Testimony of Kenneth F. Russell.)

in suit would you construct such an apparatus, to perform the same result as stated to be intended by patent '480, and without the benefit of patent '480 before you?

The Witness: Well, if it was to remove the dust particles and water particles that were carried in the air stream, I would introduce this in a suitable tunnel and provide means for draining off the surplus liquid that would run down through the screen.

The Court: How much water would you introduce?

The Witness: Would the water be there for the purpose of cleaning?

The Court: I am asking you. I don't know. You said that '480 is the same as the Farr patent in suit. Now, I am asking you, if you construct the patent in suit to perform the same result as '480, and all I want is your statement. [508]

The Witness: Well, that is the way I would construct it. I would take the same construction as used, now, that you have here, and I would introduce that into a duct. And to accomplish the purification of the air, I could either spray a very small amount of liquid upon the unit, by means of a pump and an exterior reservoir, or I could spray a small amount of water upon the unit.

The Court: How would you determine the amount?

The Witness: I would say just that amount that would coat the surfaces and where an excessive



(Testimony of Kenneth F. Russell.)

quantity would not be carried through. I would determine that by tests. [509]

\* \* \* \* \*

Mr. Harris: No, just the application as filed of the Wood patent, No. 2,252,242, is offered into evidence as Defendants' Exhibit Y.

The Court: It is admitted in evidence if there is no objection. (No response.)

(The document referred to was received in evidence and marked Defendants' Exhibit Y.)

By Mr. Harris:

Q. Now, Mr. Russell, will you turn to the Wood patent, [510] tab 11, and describe briefly to the Court the construction illustrated in that patent?

A. The Wood patent shows various embodiments, various forms of air filtering devices. The same filter element is used throughout.

On Fig. 5——

The Court: What is the filter element?

The Witness: Fig. 5 shows the section of the filter element.

The filter element consists of parallel plates of material that have been corrugated and placed adjacent each other and the plane of the plates is in the direction of the air flow.

When this filter element is assembled——

The Court: Just a moment. The plane of the plates is in the direction of the air flow? On Fig. 5, would the air flow be from top to bottom or from right to left?

(Testimony of Kenneth F. Russell.)

The Witness: It is an isometric drawing and it could be either. It could be either in the direction of the line a-a or it could be at right angles to that line.

By Mr. Harris:

Q. What is the direction the corrugations are relative to each other and the adjacent plates?

A. The relation of the corrugations may be at an angle to each other. [511]

When this element is assembled into a panel filter type of unit as shown on Fig. 12 and Fig. 13, the arrangement of the filter element is shown better in that 12 than 13.

The Court: On Fig. 13, the direction of the flow would be d-d, the d at the top?

The Witness: Yes, either from left to right or right to left.

By Mr. Harris:

Q. Now with relation to this filter, what are the corrugated plates made of?

A. On page 7, column 2, lines 23 to 30, he describes the material of the plates as either of sheet metal or similar type of material, such as corrugated paper coated with a viscous oil.

The Court: Is it foraminous?

The Witness: No, sir, it is not. They are solid sheets.

By Mr. Harris:

Q. I show you Defendants' Exhibit A, which is the P-5 obsolete type filter. Will you compare that with the disclosure of the filter panel of the Wood patent?

(Testimony of Kenneth F. Russell.)

A. The filter shown in Exhibit A, if it were constructed of paper or sheet metal, would have a construction similar to the device shown in Fig. 12 of the Wood patent.

The Court: Let me see it.

(The exhibit referred to was passed to the Court.) [512]

By Mr. Harris:

Q. What differences, if any, are there?

A. The difference in this unit is that the material is of screen material instead of paper or sheet metal.

Q. Now referring next to the Kirkham (British) patent, which is tab No. 12, the patent being No. 24,467, will you describe briefly what is illustrated in that patent?

The Court: Before you come to that, take Fig. 3 of the Wood patent on page 2. Is that an embodiment of it in a boiler?

The Witness: That would be what would be commonly called in the air filtering industry an embodiment of the filter in a self-washing oil bath type of unit. I shouldn't say "oil," it would be a suitable liquid to be placed in the sump at the bottom and the air would flow in at the top through the opening No. 17, down through the rectangular opening 11, then through the rectangular opening 51, which is shown in the bottom section of the drawing, then the arrow 98 would show the direction of the air as it is diverted on up to the filter element.

The Court: I cannot find 98.

(Testimony of Kenneth F. Russell.)

The Witness: It is in the lower section on the right-hand side in the cutaway portion of the view. The letter 98 is just to the right of the upper edge, just two numbers down from 51. [513]

The Court: Yes, I see it.

The Witness: That arrow indicates the path of the air.

A suitable liquid is carried in the bottom of the reservoir and the air would pick up some of the liquid and then is diverted toward the entrance to the filter element which is indicated as 27.

The Court: But how does it get from down below up to 27?

The Witness: Well, this unit is in sections, of course, and the upper portion has been separated from the lower portion. The lower portion should be in contact with the flange of the upper portion. They merely drop the cup so that you can see the inside construction.

The internal construction is not too clear, however.

The Court: So it would come back up into 27?

The Witness: Back up through the filtering device 27 and then out through the horizontal outlet 22 which is up near the top of the element.

By Mr. Harris:

Q. What would be the general direction of flow through the filtering device 27?

A. The general direction would be—it is rather hard to describe on Fig. 3—but it would be in at the bottom and out at the top and the flow would be between the plates.

(Testimony of Kenneth F. Russell.)

Q. In that are the plates disclosed parallel to the [514] general direction of flow?

A. Yes, they are. The general plane of the plates are parallel with the flow.

Mr. Harris: Does Your Honor have any further questions on that construction?

The Court: Not right now.

By Mr. Harris:

Q. Turning to the Kirkham (British) patent that I have identified, will you briefly state what is illustrated in that patent?

A. The Kirkham patent shows an improvement in an apparatus for washing and scrubbing gas.

On page 2, line 3, it is referred to as a gas washer or scrubber for filtering gas—correction—it states it is a gas washing and scrubbing apparatus.

This unit is of a rotating construction. The unit consists of a series of parallel discs and each of these discs is made up of a number of segments and the segments in any one section are grouped together as shown in Fig. 2 and Fig. 1.

Q. What are those segments made of?

A. These segments are made of alternate layers of corrugated material or they may have corrugated material with a flat sheet or board placed between the corrugated sheets. [515]

The Court: It says corrugated metal or wire gauze.

The Witness: Yes, Your Honor. That is the type of material.



(Testimony of Kenneth F. Russell.)

By Mr. Harris:

Q. What would be the direction of flow going through that device?

A. The direction of flow as indicated is radial on page 2, line 29 and 31.

Q. How are the plates which you have referred to positioned with regard to the direction of flow?

A. The plates of this unit are parallel to the direction of flow and the corrugations on the plates may be at an angle with each other or they may be as shown in Fig. 2.

Q. In your opinion, would that device operate to take dust particles out of the gaseous flow through it?

Mr. Leonard S. Lyon: I would like to ask a question on voir dire, Your Honor.

The Court: Very well.

#### Voir Dire Examination

By Mr. Leonard S. Lyon:

Q. Have you ever seen a device like the one described in this patent?

A. No, I have not.

Q. You have never made any tests of such a device?

A. No, I have never made any tests. [516]

Mr. Leonard S. Lyon: I object to the opinion, Your Honor, as purely speculative and of no aid to the Court.

The Court: Overruled.